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NOVEMBER–DECEMBER 2022

WHO'S KILLING THESE DEER?

Why feeding big game in winter is harmful—and illegal

IN THIS ISSUE:

MDT'S ROAD(KILL) WARRIORS

LOOK DOWN TO SEE FALL'S OTHER COLORS

WILDLIFE RESEARCH: PRACTICAL AND ESSENTIAL

Montana Outdoors

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Montana Outdoors

NOVEMBER–DECEMBER 2022

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The unintended—and sometimes fatal—consequences of providing food to deer, elk, moose, and other wildlife in winter. *By Julie Lue*

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FALL COLORS Orange rock-posy lichen is just one of the countless organisms that light up Montana's autumn landscapes. Photo by Craig Barfoot.

COVER Whitetails in northwestern Montana. Though hungry, these and other deer and elk are much better off not being artificially fed in winter. See why on page 12. Photo by Donald M. Jones.

Tears and inspiration

As a hunter who has lost many gun dogs over the decades, Hal Herring's "My Seasons with Bear" (September-October 2022) brought me to tears. I want to thank him for his inspiring message at the end.

Douglas Anderson
Great Falls

Editor's note: Hal Herring finishes his moving essay with: "So much of the best of [life] will only happen once. What I learned was to pay attention. Look around, feel this, love this, believe this. It is this way. And it will never be this way again."

Last night I read "My Seasons with Bear." Mr. Herring's story of his beloved dog brought me into his past and then to tears. His storytelling is magnificent. Can he write for us every month?

Matt Sullivan
Florence

Editor replies: We hope Hal can write more for Montana Outdoors *down the road, but for now he is holed up in a dusty office in Augusta writing a book on the history, present challenges, and future of American public land, which he calls "as important to a future that we want to live in as the Bill of Rights or the U.S. Constitution."*

Thanks for your always-great magazine. Hal Herring's article about his adventures with his dog was a wonderful story. He truly captures the relationship people have with their dogs. I have been blessed with having many similar relationships. After over 30 years, I still think of my first Labrador, Rascal. He is buried in a special place where I still hunt and reflect on our many hunts together.

Jack Weiss
Bozeman

Why the ups and downs?

In your article "What about Whitetails?" *(September-October)*,

MY SEASONS WITH BEAR

The author reflects on the time he spent afield, and at home, with the greatest hunting friend he's ever had.

you include a chart showing the statewide white-tailed and mule deer population estimates from 1999 to 2020. The chart shows that both populations had significant declines from 2007 to 2012, mulies especially. What accounts for that decline and the subsequent population increase from 2012 to 2017 for both species?

Dave Swenson
Ames, IA

Brian Wakeling, chief of the FWP Game Management Bureau, replies: The fall and rise are mainly due to weather. Both deer species were beset by a series of hard winters that culminated in the especially brutal winters of 2010-2011 and 2011-2012. Following those severe winters, weather was more favorable

> "Years of low survival and recruitment can be challenging for deer populations. When things are favorable, populations can grow quite rapidly.

and the populations began to rebound. Most populations are most sensitive to adult female survival, but young deer can have a hard time making it when winters are harsh. Other factors include drought, which can reduce availability of vegetation to allow deer to put on enough fat to get them through winter, as well as outbreaks of the EHD virus in whitetails. Repeated years of low survival and "recruitment" (fawn survival during their first year) can be challenging for deer populations regardless of species. When things are favorable, populations can grow quite rapidly. Deer population ups and downs happen with such regularity, especially in eastern Montana, that several of our longtime biologists refer to the phenomenon as "cycles."

More "Next 100" comments

I thought that your Next 100 special issue (July-August 2022) was a well-done effort to promote our outstanding wildlife, wildlands, and outdoor recreation opportunities. However, these days I'm not so sure that Montana's natural heritage needs much more promotion. What it needs is more protection. Perhaps in the future you could publish a special issue on "100 Ways You Can Help to Conserve Montana's Outdoors." As our state grows and changes, that is what we need to be promoting.

Dennis Glick
Livingston

It was great to see Number 15: "Join a Conservation Organization," on your Next 100 list. That's one of the easiest to check off, a fundamental part of the Montana outdoor tradition, and a good way to build personal connections to the land and land management.

Your readers are guaranteed to check off many other Next 100 items while helping a conservation group. For instance, FWP supports many local conservation organizations through its Recreational Trails Program (RTP) and Montana Trail Stewardship Grant Program, administering competitive funding for effective on-the-ground projects.

If you hike, bike, Nordic ski, ride an ATV or snowmobile, or do volunteer trail work in Montana, you've probably benefited from these FWP programs without even knowing it. Last summer in the Absaroka-Beartooth Wilderness alone, RTP directly supported five of our volunteer projects maintaining 52 miles of trail, and our two wilderness steward seasonal staff, who cleared 666 water bars and crosscut-sawed 1,324 logs while maintaining 185 miles of trail. Thank you to everyone, particularly FWP, who supports the work of local conservation organizations across Montana.

Patrick Cross
Executive Director, Absaroka Beartooth Wilderness Foundation
Red Lodge

CORRECTIONS

The ferry pictured on page 46 of the July-August 2022 "Next 100" issue is the McClelland-Stafford Ferry, located on the Missouri River north of Lewistown, not the Carter Ferry. In that same issue, we got the dates and location of the Race to the Sky (page 49) wrong. The dogsled race starts the second Saturday in February and begins and ends in Lincoln. Visit racetothesky.org for additional information. ■

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Westslope cutthroat trout

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Daniel Boulud's Chestnut-Roasted Venison

Preparation time: 15 minutes plus 4-6 hours to marinate | Cooking time: 30–40 minutes | Serves 4–8

CHESTNUT-CRUSTED ROAST BY LORA WILEY-LENNARTZ

Holiday season is fast approaching, and for many of us it's time to start thinking about putting together an extraordinary game dish to dazzle visiting friends, family members, or both.

This delicious nut-crusted roast will do nicely. The simple recipe comes from the French chef and restauranteur Daniel Boulud in his *The Café Boulud Cookbook: French-American Recipes for the Home Cook*. When it's available, a meal of this scrumptious roast costs about $100 at Boulud's two-Michelin-star New York City restaurant, Daniel. But those of us without money to burn can easily make it at home for a fraction of the price.

Serve this with Boulud's legendary Spiced Sweet Potato Puree. It's listed on celebrity chef Rachel Ray's website at rachaelrayshow.com/recipes/spiced-sweet-potato-puree-daniel-boulud.

Be prepared for guests asking to take home leftovers. Happy holidays. ■

—Tom Dickson is editor of Montana Outdoors.

INGREDIENTS

2 to 4 pounds venison (elk, deer, or moose) loin

Marinade
1 t. grated orange zest
½ c. freshly squeezed orange juice
2 T. extra-virgin olive oil
1 t. ground cinnamon
¼ t. ground star anise
¼ t. black peppercorns
Pinch of freshly grated nutmeg
2 cloves garlic, peeled and crushed
1 sprig fresh thyme or ½ t. dried thyme

Nut crust
¾ lb. peeled chestnuts
Salt and pepper
1 large egg
1 T. water
½ c. flour

DIRECTIONS

Mix marinade ingredients in a medium bowl. Pour into a sealable plastic bag, add the loin, and squeeze out all the air before sealing. Refrigerate 4 to 6 hours.

Meanwhile, break the chestnuts into smaller pieces, spread onto a baking sheet, and warm in a 275-degree oven while the meat marinades. Pulse in a food processor or chop with a bread knife into ¼-inch chunks; discard smaller pieces and any powder.

Preheat oven to 425 degrees. Meanwhile, remove venison from marinade, pat dry, and season with salt and pepper. Beat one large egg plus 1 T. water in a pie plate. Dust venison with flour, roll it in the egg mixture, then firmly press the chestnut pieces around the meat, covering thoroughly.

Place in a roasting pan or cast-iron skillet and roast for 20 to 40 minutes, depending on the size of the loin. You want the chestnuts to reach a deep, golden brown and the meat's internal temperature to be about 120 degrees for medium-rare, which is ideal to bring out venison's sweet flavor. ■

Shank redemption

Each hunting season, countless deer, elk, and pronghorn shanks get tossed in the garbage or turned into sausage when they could be featured in any number of scrumptious braised venison recipes. Do yourself a favor this season and keep your shanks. Then head to the *Montana Outdoors* recipe page on the FWP website (**fwp.mt.gov/montana-outdoors/recipes**) and try any of these three delicious recipes: Red Rooster Braised Venison, Perfect Braised Venison, or Braised Portuguese Venison Shanks. **Note**: *If the shanks are not fork tender after the allotted braising time, continue cooking for an extra hour or two until they are. Email me at tdickson@mt.gov and let me know how it turns out.*

Montana Outdoors yummy braised venison recipes ▶

We're engaging with the public more than ever

Here at FWP, we try to be as transparent as possible about our plans and operations. Montanans have an intense interest in everything this department does, and we take seriously our responsibility to tell the public what we do and why we do it.

Take this magazine, for example. Every eight weeks, we explain FWP activities and accomplishments and deliver that news to 50,000 subscribers. Plus, there's the department's extensive website—recently named the best state conservation agency website in the nation. Add to that our social media outreach (Twitter, Facebook, Instagram), news releases (sent to statewide news media and emailed directly to thousands of subscribers), billboards, public service announcements, regulations booklets, and dozens of education programs. Not to mention the old-fashioned conversations that FWP employees conduct with Montanans either over the phone or face-to-face across the state every single day.

All this public engagement fits in with FWP's core values of serving the public, embracing the public trust concept, and providing leadership and stewardship.

But we can do even more to let people know what's going on here at FWP and convey more of what this department does to enhance Montana's outdoor resources and recreation.

One big change we've made recently is to improve the public process for engaging with the Fish and Wildlife Commission. In the past, how FWP developed proposals (such as new hunting regulations) and the way they were presented to the commission was sometimes confusing to the public. Now there's a clear process for amending proposals and publicizing any amendments before a commission meeting. This way, the public knows what the proposals are and what changes are being discussed ahead of time.

We're also increasing opportunities for Montanans to meet with our staff, ask questions, and make their opinions heard. Over the past several months, we've held dozens of public meetings across Montana on establishing elk population objectives; Montana's draft elk management plan; proposed fishing regulations; and disease and invasive species issues (such as chronic wasting disease).

Can't make these and other meetings in person? We provide options through Zoom so you can participate from home. For Fish and Wildlife Commission or Parks and Recreation Board meetings, you can visit regional offices and participate in the meetings live on-screen. If people prefer, they can call or write us. I read every single letter that crosses my desk.

We recently finished a series of open house forums at regional offices across the state where people met with me personally, asked me direct questions about management, and voiced their concerns.

I got an earful, which is exactly what I wanted.

In addition, FWP regional offices organize special public gatherings on local issues. For instance, our crew in Kalispell recently started a Coffee with the Commissioner series, where people can have donuts and coffee and talk with Fish and Wildlife commissioner Pat Tabor. "We're trying our darndest to give people the chance to come talk to us face to face and get answers," Dillon Tabish, our Region 1 Communication and Education Program manager tells me.

Hunters line up to speak at a Fish and Wildlife Commission meeting in early 2022.

One big change we've made recently is to improve the public process for engaging with the Fish and Wildlife Commission.

Bear in mind that just because a person states their opinion doesn't necessarily mean that FWP or the Fish and Wildlife Commission will do exactly what that individual wants. We consider all viewpoints that come to this department. But opinions are widely varied and we need to find reasonable compromises. Opposing comments like "Kill all wolves" and "Save all wolves" inevitably mean not everyone gets their way. But everyone does get the chance to be heard and have their opinion considered.

Montana's public resources are *your* public resources. You deserve the chance to weigh in on how they are managed. Some people may disagree with our final decisions. That's been the case since the founding of this agency. But as Dillon says, we're doing "our darndest" to be as transparent as we can about how those decisions are made.

—**Hank Worsech**, Director, Montana Fish, Wildlife & Parks

THOM BRIDGE/*HELENA IR*

FRONT LINE LEADER

PAM KAISER
Front Office Manager, FWP Region 5 Headquarters, Billings

AS THE OFFICE MANAGER, my job is to make sure this building is open each morning and that the lights are on, the walks are shoveled, the building and grounds are safe, and all the other work that goes into keeping a state facility in operation gets done. I supervise the three other people on our team—Carrie, Jobie, and Robbie—and provide guidance and support. They are all great at what they do, and I'm here to help them carry out that great work as best they can.

JOHN WARNER

I benefited from that same management approach when I was an administrative assistant supervised by the amazing Dianne Stiff, who recently retired as office manager after working for FWP for 40 years.

As at all FWP regional offices, our team answers a constant stream of questions from people coming through the front door or contacting us by email, phone, or social media. With all the technology we now use, we've come a long way from when I started here in 1989 and we made all our calls with rotary telephones and issued handwritten licenses while filing the carbon copies.

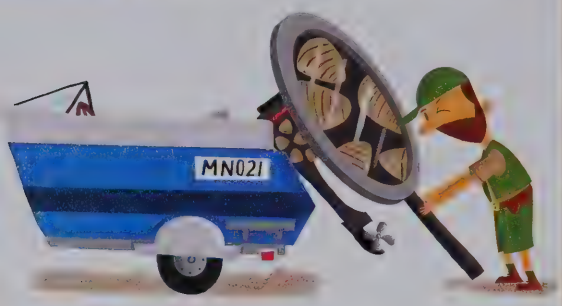
Then as now, we've always needed to know pretty much everything there is to know about Montana hunting and fishing regulations, state parks, trails, residency requirements, orphaned and nuisance animals—you name it. Or at least we need to know who to direct people to, like FWP game wardens, biologists, or staff at the other FWP regional offices, as well as the U.S. Forest Service, the Bureau of Land Management, and other state and federal agencies.

In this picture I'm outside of my usual work area—I never actually sit on a table!—but we did it to show off our new front lobby, which is very popular with visitors. All the mounts are fish and wildlife species found in this region of Montana. Right outside, we often have the real thing passing through. Lake Elmo is out those front windows, and we'll see Canada geese, ducks, and the occasional loon on the lake. And even though we're situated in a residential area, we've had pronghorn and white-tailed deer come past the office, plus foxes, bobcats, and even a chukar we once found sitting by the front door.

I guess all that wild activity is appropriate for an office staffed with people who care so much about fish and wildlife and serving those out angling, hunting, visiting parks, and otherwise enjoying Montana's natural world.

Zack Clothier was hiking with his camera in the Flathead National Forest near Columbia Falls last winter when he spotted several Bohemian waxwings flitting among the bare branches of quaking aspen saplings. The Seeley-based photographer says he rarely shoots birds, focusing his attention mostly on mammals and landscapes, "but I'm an opportunist and try never to miss a chance for a good photo."

Clothier was able to take just a single shot of this bird before it flew off. He says what he likes most about the photo is its simplicity and the contrast between the bareness of the branches and the bright color of the waxwing. "It was a cold evening and the sun had just set over the mountains, so the light was especially soft and beautiful." ■



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Number of boats, out of more than 70,000 checked, that FWP Aquatic Invasive Species Program check station crews found carrying invasive zebra and quagga mussels in 2022, the greatest number since inspections began in 2015. All mussels were removed, and the boats were thoroughly decontaminated before being allowed to continue traveling.

What duck is this? Hint: "baldpate."

Know your ducks

Waterfowl season in Montana is under way until January 5 or January 13, depending on where you hunt (consult the 2022 migratory bird regulations booklet). To avoid illegally shooting the wrong bird, hunters need to identify duck species and sex when the waterfowl are flying past or overhead. To help, *Montana Outdoors* has produced a duck ID guide. View it here:

CONSERVATION

RAWA nears the finish line

As this issue of *Montana Outdoors* went to press in mid-October, the Recovering America's Wildlife Act (RAWA) was poised to reach the Senate floor for a vote with expected strong bipartisan support. The House version of RAWA passed 231-190 in June.

The landmark bipartisan legislation will provide a total of $1.39 billion each year for states, territories, and tribes to protect and restore habitats for species of greatest conservation concern across the United States.

RAWA, which grew out of a 2014 citizen panel convened by Bass Pro Shops founder John Morris and former Wyoming governor Dave Freudenthal, would solve a problem that has been vexing wildlife agencies for decades: how to fund nongame wildlife conservation. Most wildlife agencies get their revenue from hunting and fishing license fees and federal excise taxes (the Pittman-Robertson and Dingell-Johnson acts) on guns, ammo, fishing gear, and boat fuel. The agencies' work, in turn, benefits primarily game species.

The management of nongame fish and wildlife species—which in Montana outnumber game species five to one (440 to 88)—receives just a fraction of what goes into managing game animals. There is no equivalent federal excise tax on mountain bikes, camping gear, kayaks, hiking boots, binoculars, birdseed, and other general outdoor recreation items to generate nongame conservation funding. Instead, nongame management is funded mainly by the federal State Wildlife Grant Program using intermittent revenue from offshore oil and gas leases.

RAWA includes $750 million for a new Endangered Species Recovery and Habitat Conservation Legacy Fund, dedicated to getting species off the federal endangered species list. The money would go to developing recovery plans for threatened and endangered species, conserving critical habitat on private land, and securing voluntary conservation agreements.

RAWA spending would be guided by federally approved State Wildlife Action Plans (SWAP). Montana's first SWAP was produced in 2006 and updated in 2015. The 400-plus-page document identifies the ecological communities most requiring conservation (including intermountain and prairie rivers and streams, prairie wetlands, sagebrush-steppe grasslands, and mountain grasslands) and the fish and wildlife species in greatest conservation need (such as the pallid sturgeon, hoary bat, Canada lynx, fisher, burrowing owl, and sage-grouse).

"If RAWA passes, and things look encouraging right now, it would result in unprecedented funding available to Montana for carrying out our State Wildlife Action Plan," says Hank Worsech, FWP director. "It would also conserve vital habitats used by those species and by the people who live in and recreate across Montana." ■

CLOCKWISE FROM TOP LEFT: MIKE MORAN ILLUSTRATION; LUKE DURAN/*MONTANA OUTDOORS*; SHUTTERSTOCK

MONTANA STATE PARKS

Miffy's state park adventure

Four-year-old Lulu and her parents were a day's drive from Lewis & Clark Caverns State Park when they realized one of their family members was missing.

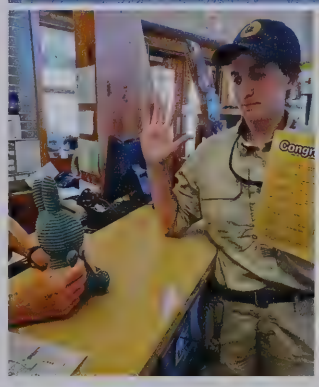
Miffy—a blue stuffed bunny and Lulu's best friend—had been accidentally left behind. By this time the Washington family was in northern Wyoming, and Lulu was heartbroken. Her mom, Reagan, called the state park and left a voicemail, hoping for the best.

The next morning, a park employee replied with a text message: Miffy had been found! Reagan texted back that the family would return in a week to pick up the beloved bunny. To put young Lulu's mind at ease, park ranger Ramona Radonish, administrative assistant Lorie Steerman, assistant park manager Katherine Clement, and maintenance worker Brian Giordano took Miffy on adventures in the park and sent photos to the family each day.

Miffy completed the park's activity booklet to become a full-fledged junior ranger. She learned about rattlesnakes, went bird watching, helped with groundskeeping (while riding on the mower), and took occasional naps to rest up for further exploits. After a week, Lulu and Miffy were reunited on the family's return journey to Washington.

Reagan later emailed FWP: "The effort and kindness of the park employees was ABOVE AND BEYOND. It was incredibly heartwarming and kind, and helped our daughter get through our trip. We ultimately looped back to the caverns and were able to meet these amazing rangers and thank them." ■

Counterclockwise from bottom left: Assistant park manager Katherine Clement swears Miffy in as a junior ranger; helping maintenance worker Brian Giordano clean a restroom; looking for raptors with park ranger Ramona Radonish; taking a well-deserved rest after a long day of activities.



PHOTOS: MONTANA STATE PARKS

WESTERN MONTANA'S BEAR CRISIS

No strangers to western Montana towns and cities, black and grizzly bears appeared in unprecedented numbers this past summer due to a weak wild berry crop that drove them from mountains into lowlands in search of food. Justine Vallieres, FWP bear management specialist in Kalispell, told reporters in late September she had already received more than 550 calls in 2022 from residents and communities in northwestern Montana concerned about bears raiding garbage bins, fruit trees, porches, and chicken coops. "And it's only going to get worse between now and hibernation," she said.

Deprived of huckleberries and other wild fruits because of drought conditions, bears moved into western Montana towns in search of food and garbage to build fat reserves for winter hibernation.

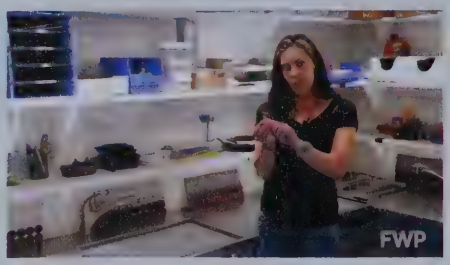
SHUTTERSTOCK

Jamie Jonkel, FWP bear management specialist in Missoula, called the current natural food conditions for bears a "crisis" that was creating dangerous situations where the large carnivores were increasingly entering residential areas. "Bears trying to put on fat for hibernation are getting desperate for calories," he said.

FWP bear specialists urged residents and communities to redouble efforts to keep food and garbage—including pet food and livestock feed—indoors where bears can't get at the attractants. "Otherwise it may mean we have to capture and kill bears for human safety concerns," Vallieres said. ■

FWP VIDEO SHOWCASE

Recent videos produced by FWP staff for social media and television



The story teeth tell

How scientists "read" the teeth of deer, elk, bears, and other wildlife brought to FWP game check stations each hunting season.

Lake Elmo rejuvenation

Why FWP drained and subsequently improved recreation amenities around Lake Elmo in Billings following the discovery of invasive aquatic clams in this popular state park impoundment.

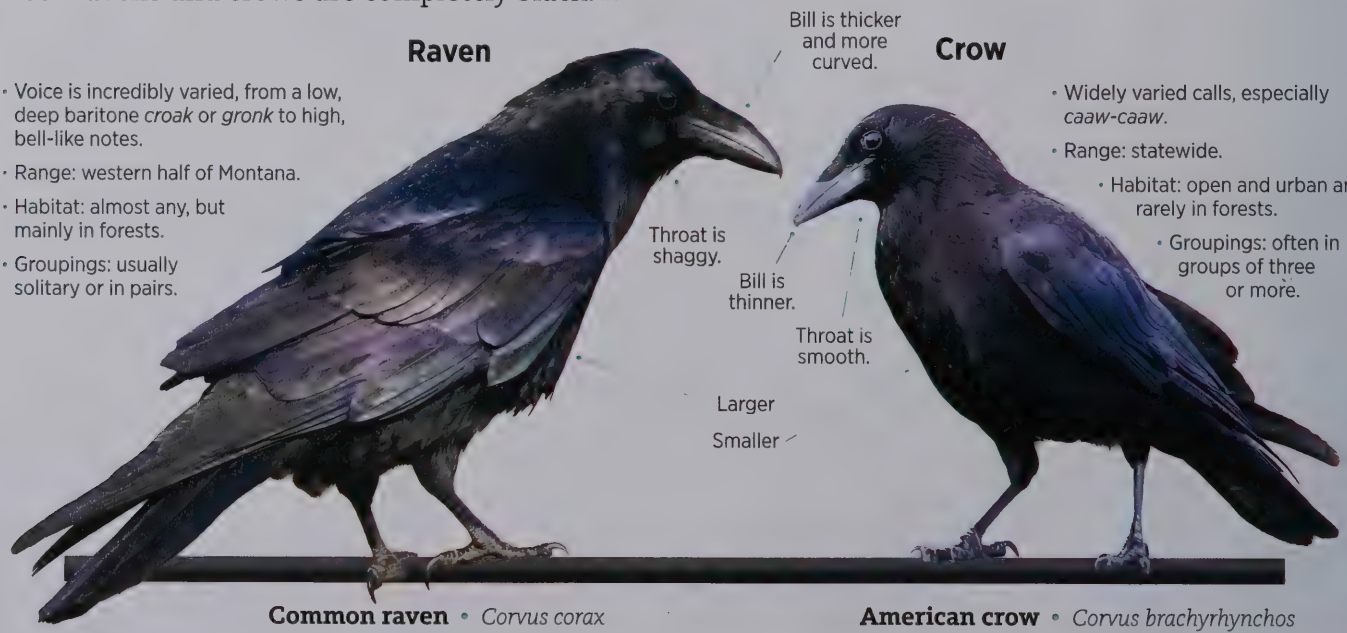
Montana WILD

FWP education specialist Corie Bowditch takes viewers on a brief look at a typical action-packed day at the Montana WILD Education Center in Helena.

LOOKALIKES

Tips for differentiating similar-looking species

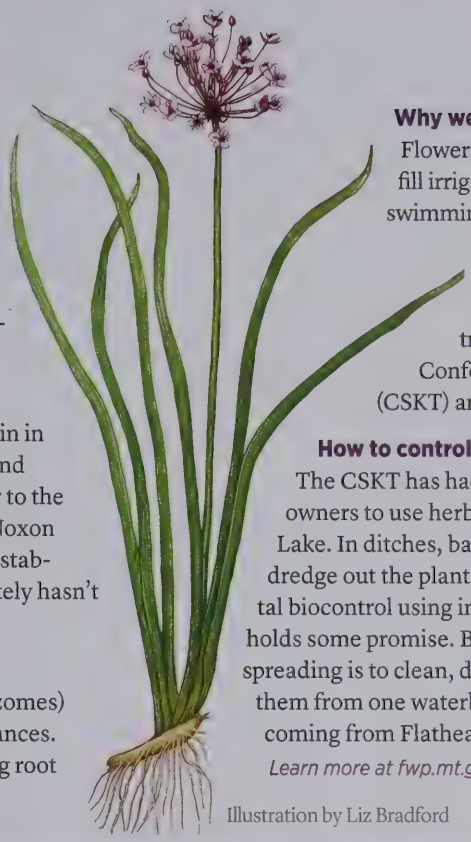
Ravens and American crows are both members of the Corvidae family, which also includes the magpie, gray jay, Clark's nutcracker, and Steller's jay. All corvids are smart and highly vocal. Both ravens and crows are completely black. ■



SHUTTERSTOCK

Flowering rush

Butomus umbellatus



What it is

Flowering rush is an aquatic plant that, at a glance, resembles any of several native sedges and bulrushes (grasslike plants) found in shallow-water areas. The name is misleading, because the type in Montana rarely shows its pink flowers, making it hard to identify.

Where it's found

Flowering rush was introduced to the Flathead Basin in the mid-1960s as an ornamental. It later escaped and spread, the plants drifting down the Flathead River to the Clark Fork River and then farther downstream to Noxon and Cabinet Gorge reservoirs. The species is now established throughout these water systems but fortunately hasn't spread to others.

How it spreads

This aggressive species spreads when its roots (rhizomes) are fragmented by boat propellers or other disturbances. Each rhizome piece can drift for miles before taking root and propagating.

Why we hate it

Flowering rush grows in thick mats that fill irrigation ditches and clog boating and swimming areas on lakes and reservoirs. It also creates ideal habitat for northern pike, which proliferate and gobble up young westslope cutthroat and bull trout, native species that FWP and the Confederated Salish and Kootenai Tribes (CSKT) are trying to recover on Flathead Lake.

How to control it

The CSKT has had some success working with homeowners to use herbicides on the south shore of Flathead Lake. In ditches, backhoes sometimes are required to dredge out the plant and keep water flowing. Experimental biocontrol using insects from Europe to eat the plant holds some promise. But the best way to keep the plant from spreading is to clean, drain, and dry boats before moving them from one waterbody to another, especially when coming from Flathead Lake and the Clark Fork system.

Learn more at fwp.mt.gov/conservation/aquatic-invasive-species.

Illustration by Liz Bradford

"Year class"

A quick look at a concept or term commonly used in fisheries, wildlife, or state parks management.

A "year class" (or "cohort') is a specific generation of fish, born in a particular year. For any fishery, FWP biologists may discuss different year classes of different species—for example, on the Bighorn, the 2019 rainbow trout cohort or the 2017 brown trout year class.

Some year classes are stronger (more individuals than average) or weaker (fewer individuals than average) than others, usually based on the spawning conditions of that particular year. For instance, in spring of 2011, heavy winter snowpack created high water and, thus, abundant shoreline vegetation habitat and abundant nutrients in Holter Reservoir. That combination produced a record yellow perch year class. As biologists who conducted test netting each subsequent year watched perch from that super-abundant year class grow larger, they predicted extraordinary angling for 2014–18, when those fish would reach catchable sizes of 8 to 13 inches. That's exactly what happened.

A similar term, "age class," refers to a generation of fish that have lived a certain number of years. For instance, on Canyon Ferry Reservoir, biologists may talk about "age 1" walleye or "age 5" walleye and the relative abundance and average size of those fish when discussing management strategies.

Wildlife biologists also use age class when talking about the age structure of deer and elk herds. For instance, due to a severe winter three years ago, a herd may now have very few age 3 deer, because so many fawns died that winter. When biologists talk about "older age class" deer and elk, they are generally referring to a few consecutive year classes of males that have lived long enough to grow larger antlers. ■

The 2011 perch year class on Holter produced great ice fishing for four years.

SHUTTERSTOCK

When Mary Franzel saw a cow moose lying directly outside her window last winter, her first thought was, "It's really weird that the mom decided to take a snooze against the house."

The moose and her large male calf had been hanging around Franzel's home in Clark Fork, Idaho, for a few days, resisting all efforts to shoo them away. Franzel assumed they were looking for a handout. Many of her neighbors feed deer, a practice strongly discouraged by Idaho Fish and Game, but mostly legal in that state. Other than not being afraid of her, Franzel says, the cow and calf in her driveway appeared normal. "You see some moose that are shedding and look kind of grayish. But these had beautiful coats, and they had good weight."

But soon Franzel, a retired RN, realized the cow wasn't napping. The moose lay motionless, head in the snow; her calf stood beside her. In a video Franzel filmed from inside the house, the agitated calf nibbles and paws at the cow's face, his hoof making an audible clunk against her muzzle. But this moose would never wake up again. And within days, the young moose—the big, strong-looking calf with the beautiful coat—would be dead as well.

They weren't killed by winter ticks, brain worm, or any of the other usual suspects. Instead, according to T.J. Ross, regional communications manager for Idaho Fish and Game, the moose were likely victims of a most innocuous-sounding substance: food.

The wrong food, at the wrong time of year, can prove deadly for big game.

Here in Montana, unlike Idaho, it's illegal to intentionally feed big game. But according to officials with Montana Fish, Wildlife & Parks, wildlife are still fed—usually by well-meaning people who don't realize they could be responsible for animals suffering and even dying, or that they might be putting entire populations at risk. "People think they are helping wildlife," says FWP veterinarian Dr. Jennifer Ramsey, who heads the department's Wildlife Health Program in Bozeman. "But actually they can cause enormous harm."

NATURAL DIETARY CHANGES

All members of the deer family, called cervids, change diets with the seasons. In summer, the animals eat mostly high-carbohydrate leaves and forbs (flowering plants) to build and store fat for winter. As the days shorten and green foods become scarce, they eat less overall and transition to low-carb "browse"—shrubs, twigs, and tree bark. They also start burning more body fat for energy.

"Ultimately, this is what they're adapted for," says Rebecca Mowry, an FWP wildlife biologist in Hamilton. "It's natural for them to lose weight in winter. It's also natural for some of the weaker animals to die, especially calves and fawns entering winter

Julie Lue is a writer in Florence.

DEATH

The unintended—and sometimes fata
wildlife in winter. **BY JULIE LUE**

TOXIC "TREATS" Corn and other high-carbohydrate foods put out by well-meaning homeowners can disrupt the natural digestive systems of deer, elk, and other cervids, leading to an agonizing death.
PHOTO BY DONALD M. JONES

BY FEEDING

consequences of providing food to deer, elk, moose, and other

in poor body condition."

The weeding out of weaker individuals may ultimately strengthen the population while helping vegetation recover from overbrowsing. But that's the cold, scientific perspective. Most people not trained in wildlife biology find it hard to watch animals struggle through the lean months of winter. It seems to make sense that providing food for a hungry deer, elk, or moose will ease its suffering, or even save its life. But the opposite can be true, says Ramsey. "Feeding can actually decrease an animal's chance of survival."

BAD CARBS

Strangely enough, some of the most devastating effects are due to the animals' gut microbes. Like cows, sheep, and goats, cervids are ruminants. A cervid's digestive system allows it to extract enough nutrients from plants to sustain a 1,000-pound moose or a 200-pound mule deer. But the success of this process relies on a finely tuned mix of bacteria, protozoa, and fungi in the largest stomach chamber, the rumen, where partially chewed food is fermented before being regurgitated as "cud" and chewed again.

A cervid's gut microbes gradually adapt to different food sources over the seasons. In late fall they begin to accommodate the animal's increasingly sparse winter diet of low-carbohydrate, high-fiber browse. Then in early spring, the balance of microbes slowly changes again as other natural foods become available. But sudden changes spell trouble.

A mismatch of meals to microbes can lead to digestive diseases, including rumen acidosis (known as "grain overload" in cattle), which Ross says the Idaho wildlife department "strongly suspects" is responsible for the deaths of the two moose in Clark Fork.

Ramsey says that acidosis is something she considers "when we have a really rapid

> "It's natural for them to be losing weight in winter. It's also natural for some of the weaker animals to die."

RUMEN READJUSTMENT During winter, the stomachs of deer, elk, and moose undergo complex biological and chemical changes that allow the animals to survive on evergreens, willows, and other woody browse.

death," particularly in big game animals in otherwise decent condition with access to unnatural food sources. She explains that a high-carb meal of corn or other grain, birdseed, apples, or rich hay can set in motion a dangerous cycle—especially if the animal is not accustomed to that diet. The carbs trigger an explosion of stomach bacteria that produce lactic acid, which eventually kills healthy bacteria and causes inflammation and ulcers. "When it's angry and inflamed, the rumen [stomach] wall is unable to absorb nutrients, so the animal can't take advantage of the food," says Ramsey. "The animal can actually be starving with a full stomach."

The buildup of lactic acid also causes fluid to accumulate in the rumen. "In a necropsy we'll see the rumen full of sloshy fluid and food, but the animal itself is dehydrated because all their fluid is being sucked into the rumen rather than hydrating the cells of their body," Ramsey adds. To top things off, the lactic acid eventually reaches the bloodstream at dangerous levels.

At this point, most animals may look healthy, but "often they'll die of acidosis within 24, maybe 48 hours," says Ramsey. "And it's a really painful way for an animal to die."

Artificially fed deer, elk, and moose can also succumb to enterotoxemia, a deadly disease caused by the overgrowth of *Clostridium* bacteria in the stomach. And they can die simply because they gorge on a large quantity of food they are unable to process. Ramsey says that when a skinny, starving deer in late winter or early spring comes across a haystack stored for cattle, "rather than going out and looking for browse to eat, which their stomach has adapted to process, they zero in on this really nice big green pile of hay their body can't handle and end up standing there and starving to death."

That's not to throw blame at ranchers. "They don't want deer or elk eating food meant for horses or cattle, but it can be hard to keep determined wildlife away from haystacks," Ramsey adds.

FATAL ATTRACTION

Digestive diseases aren't killing cervids at levels that affect entire herds. But illegal feeding does cause wildlife to congregate and spread parasites and diseases. The biggest concern is chronic wasting disease (CWD), an always-fatal neurological malady that affects members of the deer family. Transmitted through an animal's urine, blood, feces, saliva, and body tissues, CWD has spread across much of Montana. In these areas, anything that unnaturally concentrates deer, elk, or moose has the potential to turn a spark into a flame.

The town of Libby is one such hot spot, with both a large deer population and a high rate of CWD infection, says Neil Anderson, FWP's regional wildlife manager in Kalispell. "You've got a highly concentrated density of deer on the landscape in areas where they are lingering and sharing food sources," he says. "That can result in a higher transmission rate for diseases like CWD." Prevalence of the disease declines outside of Libby, Anderson says, where deer are more dispersed and less likely to be fed by people.

Animals that contract CWD don't drop dead immediately; they may look normal for months or even years before showing symptoms. But once they are infected, Anderson says, "It's a death sentence." The disease can affect large numbers of animals; mule

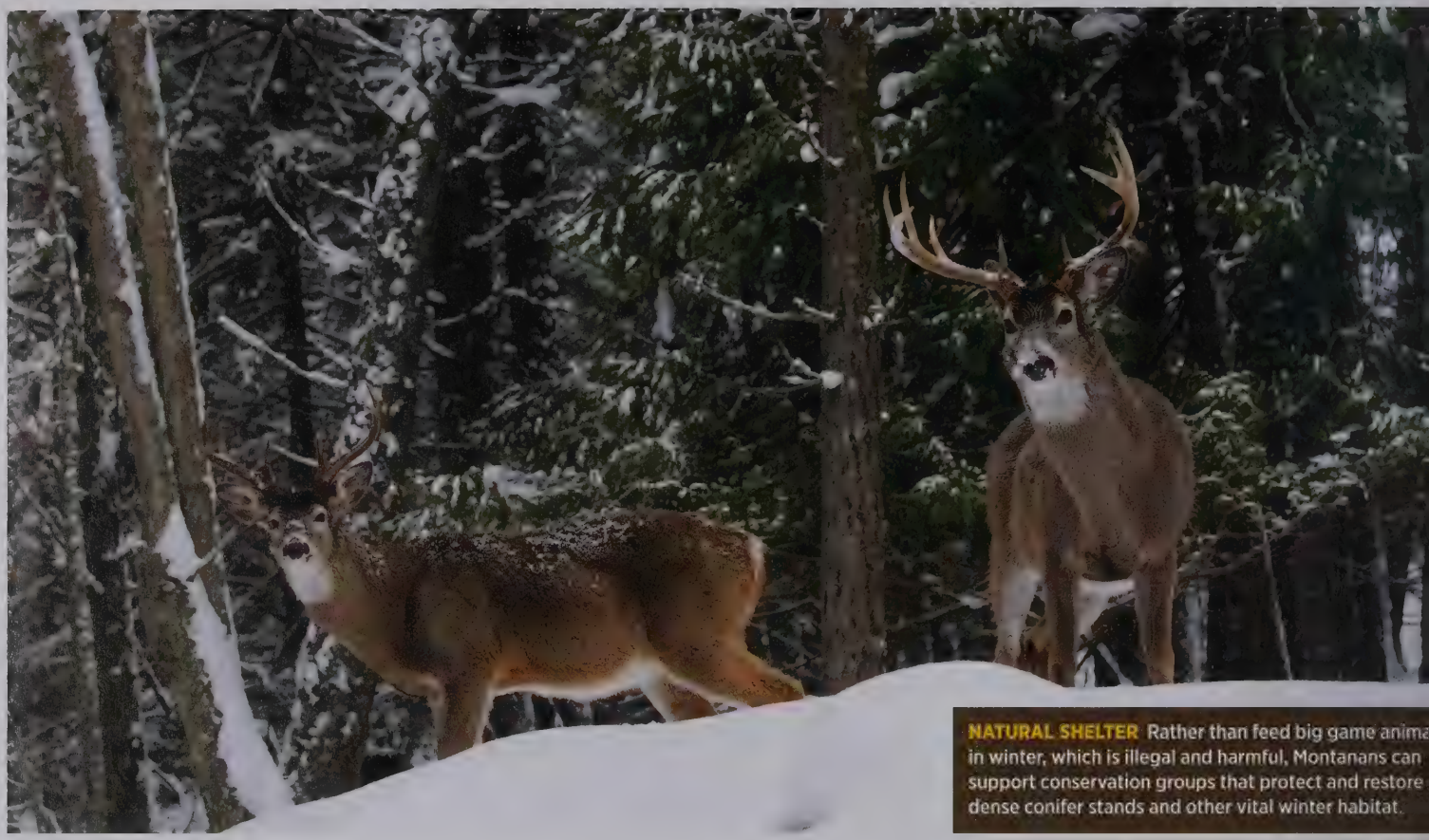
Gut bomb

The stomachs of deer, elk, and moose are complex organs where plant matter is broken down by microbes through fermentation to become more digestible. In winter, the mix of microbes changes so the animals can process high-fiber woody browse such as twigs. The animals survive winter on browse as well as fat reserves built during the previous summer.

But when people feed big game animals corn and other grain, birdseed, hay, or apples:

- The high-carb foods can cause an overgrowth of bacteria in the stomach that produces lactic acid, which leads to inflammation, abcesses, and ulcers in the stomach wall.
- The inflamed wall can no longer absorb nutrients, and the lactic acid leaks from the rumen into the bloodstream, destroying cells and tissues and eventually causing death.

LEFT TO RIGHT: DONALD M. JONES; RON HOI F. ILLUSTRATION BY LIZ BRADFORD

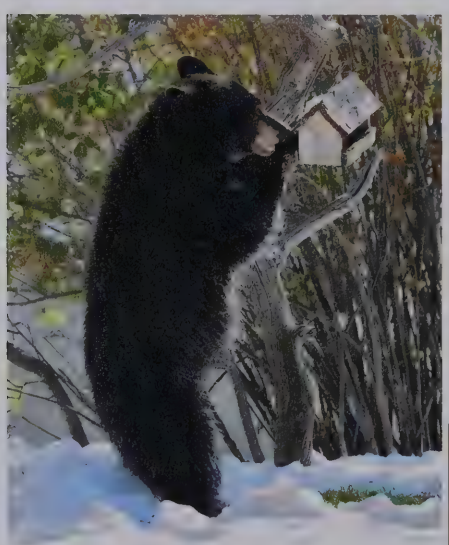


NATURAL SHELTER Rather than feed big game anima in winter, which is illegal and harmful, Montanans can support conservation groups that protect and restore dense conifer stands and other vital winter habitat.

deer populations in Colorado and Wyoming have declined where CWD has been present for decades.

Feel-good feeding can also make wild animals lose their fear of humans, causing them to venture too close to people and homes. Mowry has received complaints from Bitterroot Valley residents about aggressive mule deer. Deer, elk, and moose can mow down costly landscaping plants. And while on the hunt for easy neighborhood meals, the big animals cross roads repeatedly, increasing the odds of collisions. One orphaned moose calf fed by Hamilton residents during January 2021 was hit by a car and had to be put down by FWP game wardens.

Backyard feeding also attracts grizzlies, black bears, and smaller animals like rodents, foxes, skunks, coyotes, and raccoons. "If you're consistently feeding big game, you'll eventually end up with a raccoon that sets up shop under your porch," says Torrey Ritter, FWP nongame wildlife biologist in Missoula. "And bird feeders can draw grizzlies and black bears before and after hibernation." Unnatural concentrations of deer also attract mountain lions, creating stress especially for parents and pet owners.



> "Bird feeders can draw grizzly and black bears before and after hibernation."

"WELCOME" SIGN Any accessible foods—including birdseed—are an open invitation for grizzlies and black bears to venture dangerously close to where people live.

> "Healthy habitat can do wonders to ease wildlife suffering in winter"

HOW TO HELP

Feeding big game animals is illegal, says Anderson, the FWP regional wildlife manager, because the state wants to prevent disease and other health problems caused by food handouts. What wildlife really need, he says, is more high-quality habitat. That's where animals can find the natural foods they have traditionally eaten, as well as winter cover to help conserve body fat. Federal wildlife refuges, state wildlife areas and easements, other public lands, and properties of conservation-minded landowners can all provide these healthy natural environments.

Conversely, feeding wildlife corn or apples is "definitely not helping in the way people want to believe they're helping," Anderson says. He and other FWP officials suggest that those who want to assist wildlife consider joining a conservation group that

CLOCKWISE FROM TOP LEFT: DONALD M. JONES; DONALD M. JONES; TED GILWICK; BOB MARTINKA; USDA; WIKIPEDIA; ROD SCHLECHT

NEITHER WAY Some big game feeding is intentional, like setting out apples for deer. Some is accidental, like placing bird feeders where deer can get to the seeds and grains. But both can do lasting harm to the very animals that many people want to help during the cold winter months.

funds habitat protection and restoration. "Healthy habitat can do wonders to ease wildlife suffering in winter."

Homeowners with larger lots can protect or plant more native vegetation on their land, and landowners can conserve winter cover like dense conifer stands and cattail marshes. They can also modify fencing so that wildlife can reach natural habitats.

During the critical period in late winter and early spring when cervids' energy stores are at their lowest, hikers, cross-country skiers, and antler hunters can avoid disturbing wildlife as much as possible—and ensure their dogs do the same—so the animals don't burn up the last of their fat reserves.

But one of the most important ways to help big game is also the easiest. "If you're feeding, just stop," Anderson says. "And if you're not feeding, please don't start."

What about birds?

Feeding wild birds is generally legal in Montana as long as you do it in a way that doesn't attract big game, bears, or mountain lions.

But is feeding birds *good* for them?

According to Torrey Ritter, an FWP nongame wildlife biologist in Missoula, feeding can be beneficial "during winter and migration, because people have replaced so much habitat that birds need with homes and pavement."

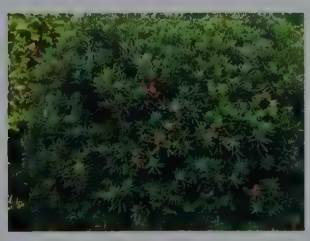
But you should think twice about attracting birds to a feeder where they are vulnerable to free-roaming cats and window strikes, or even avian predators like Cooper's hawks, sharp-shinned hawks, or northern pygmy owls. And bird feeders, especially when not kept clean, can help accelerate the spread of disease. For the past three summers, FWP has recommended no artificial bird feeding due to the risk of spreading conjunctivitis, salmonella, and avian flu. In bear country, homeowners should not be feeding in summer anyway; bird feeders should be taken down before bears leave hibernation in the spring.

One way to help wild birds is to plant native shrubs, trees, and wildflowers that winged wildlife can use for food and shelter. ■

Black-capped chickadee in native habitat.

Yew don't want these shrubs in your yard

Native Pacific yew

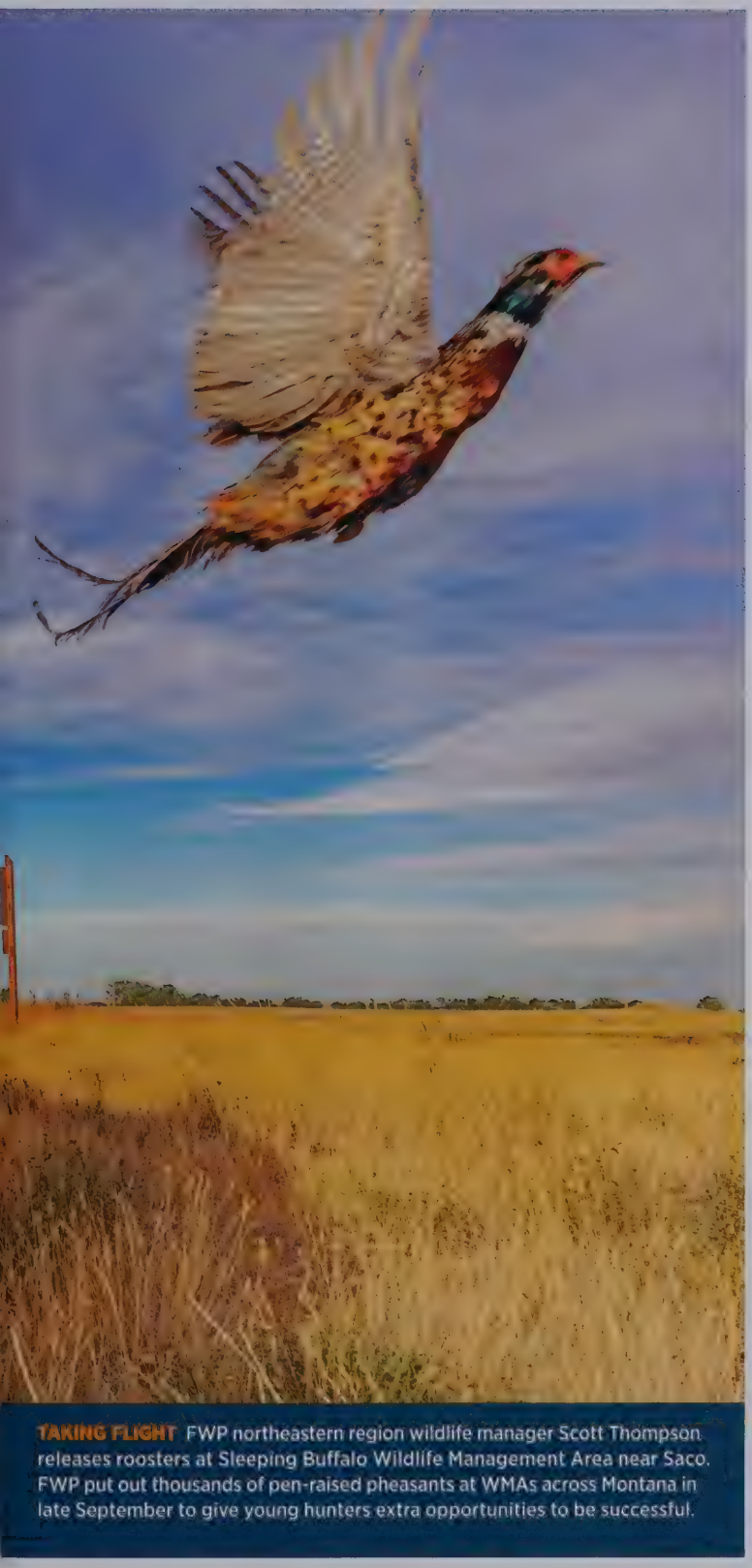


Ornamental Hick's yew

Deer and other wildlife have no problems eating native Pacific yews found in northwestern Montana. But many non-native ornamental yews sold at nurseries, like the Japanese yew and the hybrid Hick's yew—popular evergreen shrubs or trees with red berries and flattened, needlelike leaves—can be fatal to wildlife and pets. "Our Pacific yew is not toxic to deer, which is probably why they may be fooled into eating the introduced varieties that are," says Rebecca Mowry, FWP wildlife biologist in Hamilton. "Deer and elk learn what to eat from their parents, and thus probably avoid anything unfamiliar. But a toxic plant that looks just like a 'safe' plant they're accustomed to eating? That's trouble." ■

Something To

CROW About



TAKING FLIGHT FWP northeastern region wildlife manager Scott Thompson releases roosters at Sleeping Buffalo Wildlife Management Area near Saco. FWP put out thousands of pen-raised pheasants at WMAs across Montana in late September to give young hunters extra opportunities to be successful.

FWP touts the success of Montana's Roosters for Recruitment Program

By Tom Dickson. Photos by Sean R. Heavey

Parker Bradley's family doesn't own a hunting dog, but the Kalispell sixth-grader has always wanted one. So he was excited this past September 24th to hunt over a German wirehaired pointer named Junior, handled by a local member of Pheasants Forever as part of the 2022 Montana Youth Pheasant and Waterfowl Weekend.

At a local block management area, Parker and his grandpa, Vern Schrader, followed Junior over miles of upland habitat as the dog trailed fresh pheasant scent then pointed several pen-raised roosters that had been released a few days earlier. "It was awesome," Parker says.

The 11-year-old boy had shot clay pigeons several times to improve his shooting skills in the weeks before the big event. The practice paid off. Parker shot his limit of three roosters during several hours afield. "I'd never hunted pheasants before. I felt really proud of myself," he says.

> *"I'd never hunted pheasants before. I felt really proud of myself."*

While the youth hunting weekend has been around for several years, the 2022 event (September 24-25) was the second consecutive year that included pen-reared ring-necked pheasants, a non-native species popular with upland bird hunters in Montana and across the United States.

The birds were part of a pheasant stocking and release program created by the 2021 Montana Legislature, which authorized FWP to use up to $1 million each year to stock pheasants raised at the Montana State Prison near Deer Lodge onto suitable habitat on publicly accessable lands.

"This is a great way to give youth hunters a new opportunity for success," says FWP director Hank Worsech.

What FWP is calling the Roosters for Recruitment Program is for "youth hunters" (licensed 12- to 15-year-

olds who have completed hunter education and are accompanied by a nonhunting adult age 18 or older), or certified and legally licensed "apprentice hunters" 10 to 15 years old (who are accompanied by a nonhunting adult at least 21 years old). The adults may help with activities such as handling hunting dogs, retrieving downed birds, and, for waterfowl, setting up decoys and calling ducks or geese.

FWP officials say Roosters for Recruitment gives young hunters a chance to experience hunting success, encouraging future participation. Studies show that anglers and hunters who catch fish and harvest game when they first start out are more likely to continue the activities when they grow older. Lack of early success leads to high drop-out rates.

PRACTICE SESSIONS Left: FWP held kick-off events statewide before the special youth hunting weekend to give kids a chance to learn how to sign into a Block Management Area (left), find WMAs with stocked pheasants (below), and identify birds. Right: Marc Kloker, FWP regional Communication and Education Program manager, instructs a young hunter on how to "lead" a flying pheasant.

Businesses happy to help

In the weeks before the special hunting weekend, FWP held kick-off events in Kalispell, Missoula, Helena, and Miles City, and at sites near Billings, Glasgow, and Great Falls. Depending on the location, young hunters and supervising adults were treated to burgers, dog-training demonstrations, and raffles for free outdoor gear.

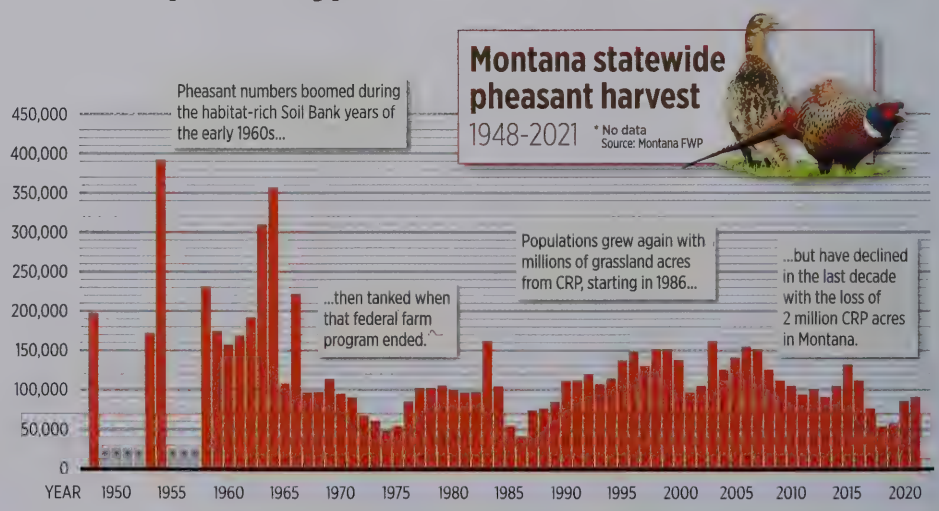
Marc Kloker, FWP's regional Communication and Education Program manager for northeastern Montana, says several Glasgow-area conservation groups provided prizes to the kids. "Youth hunting is such a positive thing up here that we had no problem getting donations," he says.

Not everyone supports the pheasant-release program. Some Montana wildlife groups frown on FWP rearing and stocking pheasants on public land. They argue that pen-raised birds could spread disease to wild birds, divert public attention from habitat projects, and degrade fair chase ethics by making it too easy for young hunters to find and kill pheasants.

But Deb O'Neill, head of FWP special projects, says the birds are monitored at the rearing site for disease, and notes that department upland habitat projects are booming. Public support, she adds, is strong. "We've received many emails and photographs from parents thanking us for the program."

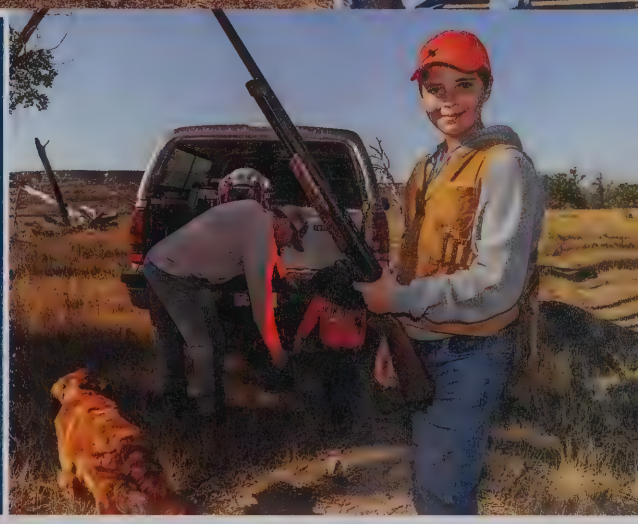
Vern Schrader, a plumber in Kalispell, is a big fan of the pheasant-release program. "The more we can get these kids outdoors, the better we can keep them away from drugs and other bad influences," he says.

Worsech compares releasing pheasants for youth hunting to FWP stocking community fishing ponds with catchable trout. "That popular program doesn't take anything away from our equally popular efforts to manage wild trout and protect and restore fish habitat on streams and rivers. And it doesn't raise any



Tom Dickson is editor of Montana Outdoors. *Sean R. Heavey is a photographer based in Glasgow.*

GETTING OUT THERE
Above: At a kick-off event held at the Glasgow Trap Club, volunteers helped young hunters learn gun safety and how to shoot a shotgun. Right: A beginner hunter and a mentor set out on the Youth Pheasant and Waterfowl Weekend at the Vandalia WMA near Hinsdale. Says FWP director Hank Worsech, "This pheassant program is great for kids and families."



questions about fair chase fishing," the FWP director says.

Inviting hunters in—and back

FWP officials say the program is part of a broader strategy to recruit, retain, and reactivate hunters—a nationwide initiative known as R3. The R3 strategy aims to stem declines in the number of hunters, who fund most game wildlife management and conservation with their license dollars and federal excise taxes on firearms and ammunition. Though the number of big game hunters remains steady in Montana, upland and migratory bird hunter numbers have declined over the past 20 years.

The R3 movement is supported by Ducks Unlimited, Pheasants Forever, and other nationwide conservation groups concerned about decreased hunter participation and associated losses in revenue for habitat restoration and other conservation work.

For decades, Montana raised pheasants on state-operated farms, but it phased out the work by 1982. Since then, the department has focused on protecting and improving habitat in Montana so that wild pheasants can reproduce on their own.

Unfortunately, the loss of upland habitat (especially more than 2 million federal Conservation Reserve Program acres in Montana alone) throughout the species' range and the effects of long-term drought have significantly reduced pheasant numbers.

As recently as 2003, Montana's statewide harvest was 163,000 roosters. But during the past five years it has averaged just 74,000 annually, according to Greg Lemon, head of the FWP Communication and Education Division. "We're still focusing on protecting prime upland habitat, but in many cases that's just not sufficient to provide enough birds to attract young hunters," Lemon says. "Roosters for Recruitment is a way to get birds out on the ground to help get kids hooked on hunting."

Looking forward to future hunts

FWP continues to fund and staff its successful Upland Game Bird Enhancement Program, which uses bird hunter license dollars and other funding to conserve and enhance upland game bird habitat and populations on lands open to public access. In 2022, Montana landowners and conservation groups partnered with FWP to conserve and enhance more than 333,000 acres of upland game bird habitat while providing nearly 800,000 acres for public upland bird hunting on more than 470 active habitat projects, according to program manager Deb Hohler. "Habitat enhancement is going great guns right now," she says.

As for Parker, the 11-year-old bird hunter from Kalispell, he can't wait to go bird hunting later this season with his grandpa Vern. "I think it will be awesome," he says.

Learn more about special youth hunting opportunities at fwp.mt.gov/hunt/youth.

Whatdunit?

Research scientists conduct studies to gather vital information biologists need to better manage Montana's wildlife. **By Tom Dickson**

Standing on a railroad track along the Big Hole River near Melrose, Vanna Boccadori scans the distant limestone bluffs, searching for a group of bighorn sheep that lives in these Pioneer Mountain foothills. For years, the Butte-based Montana Fish, Wildlife & Parks wildlife biologist has been unable to figure out why the lambs in this and four other local subherds keep dying.

"This was one of the biggest herds in Montana, with some of the world's largest rams," she says. "Now it's just a fraction of that."

Boccadori is here on this mid-June morning with Dr. Kelly Proffitt, FWP wildlife research scientist based in Bozeman. Proffitt is running a new FWP study—with financial support from the Wild Sheep Foundation and its Montana affiliate—aimed at learning what kills the lambs. The goal is to help Boccadori decide the best way to recover the struggling Highland herd, as the five subherds combined are known.

The study is typical of the roughly three dozen wildlife research projects FWP coordinates each year. Biologists need to know certain essential things about wildlife species, such as habitat requirements, migration routes, and predation rates. This allows them to make management decisions (often involving hunting season adjustments) that help populations grow (or shrink in cases of overabundance).

"If we don't know what's causing a problem, we can't solve it. That's where the research component comes in," says Brian Wakeling, who previously worked for Arizona and Nevada state wildlife agencies and now oversees the FWP Game Management Bureau.

As essential as it is, most Montanans are unaware of how wildlife research works to benefit the state's elk, deer, grizzly bears, pronghorn, waterfowl, and other wildlife. I certainly didn't, and I've worked for the department for years. Which is why I'm out with Boccadori and Proffitt on this chilly morning squinting up at the rocky cliff about a quarter-mile away.

The sharp-eyed biologists soon spot six ewes and six lambs. Proffitt says the females are extra skittish this time of year because the lambs, just a few weeks old, are especially vulnerable to mountain lions and golden eagles. Sensing three gawking humans, even at 400 yards, the family group begins running away.

Boccadori hands me her binoculars, and I watch the ewes scramble up the steep cliff, their lambs struggling to keep up. Suddenly one lamb slips and tumbles about 20 feet down the rock face, its landing obscured by a clump of wild mahogany. We stare up at the bluff and wait, fearing the worst.

SEARCHING FOR CLUES FWP wildlife research scientist Dr. Kelly Proffitt (left) and Butte-area wildlife biologist Vanna Boccadori monitor a struggling subherd of bighorn sheep in the foothills of the Pioneer Mountains.

LEFT TO RIGHT: TOM DICKSON/*MONTANA OUTDOORS*; BRETT SWAIN

"Co-production"

If the job of police detectives is to figure out "whodunit," wildlife research biologists aim to learn "whatdunit." What's causing a mountain goat herd to die out? What's impeding mule deer migrations? What's causing waterfowl disease transmission? "Without our research crews, we'd really struggle to answer the many questions the public has about Montana's wildlife," says Neil Anderson, regional wildlife manager based in Kalispell.

In fact, obtaining scientific information is why, beginning in the late 1930s, Montanans insisted that what was then

WHAT CAN BE DONE? Wild sheep lambs in several herds across western Montana are dying before they can reach one year old. A new study of the Highland herd southwest of Butte may reveal the causes and help wildlife managers figure out the best way to stem population declines.

called the Fish and Game Department hire trained research biologists in the first place. They wanted the agency to manage wildlife based on hard evidence, not hunches, guesswork, or the opinions of whoever shouts the loudest at public meetings. And that's still what Montanans want.

Information from studies, after being rigorously analyzed for flaws and inconsistencies (scientists loathe being called out by peers for sloppy work), is called "empirical" evidence. "But that doesn't mean it's set in stone," says Justin Gude, who oversees the FWP wildlife research unit. "All our results and analysis are subject to further testing to see if it holds up." Often it doesn't. But that's the beauty of the scientific method, Gude says. "Our findings are always open to review, scrutiny, and adjustment based on new learning."

> "That's the beauty of the scientific method. Our findings are always open to review, scrutiny, and adjustment based on new learning."

FISHER FOOD FWP Wildlife Research Bureau chief Justin Gude wires a deer haunch to a bait station deep in the Bitterroot Mountains. The goal is to attract fishers and then collect DNA samples that will help scientists learn where these elusive furbearers live so the habitats can be conserved.

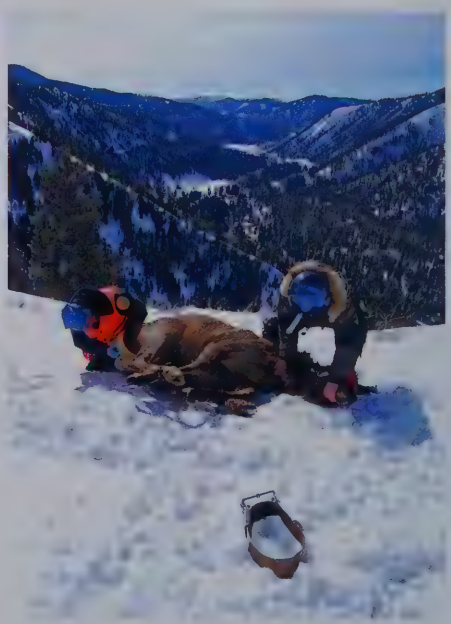
According to Wakeling, Montana is recognized throughout the West for avoiding the "loading dock" approach to research. That's when agency scientists set out to learn things on their own, then return with management advice. Instead, "FWP takes the 'co-production' approach, where field biologists work hand-in-hand with research scientists every step of the way," he says.

Shaping management

Hunters and others who value Montana's wildlife have long benefited from this information gathering and practical application. For instance, in the 1970s FWP and the University of Montana conducted an unprecedented study on the importance of dense vegetation in remote national forests where elk can hide from hunters. Based on the findings, the U.S. Forest Service has protected thousands of acres of "security" cover over the past four decades to keep more elk in publicly accessible national forests during hunting season.

One of FWP's most publicized studies took place in the upper Bitterroot Valley. The aim was to figure out why the elk population had declined by 25 percent from 2005 to 2008 and calf survival was at historic lows. The region's growing wolf population seemed the most likely suspect. Yet the study found that, in fact, mountain lions were gobbling up far more elk. Researchers working with local wildlife biologists then adjusted the study to see if boosting lion harvest would help with calf survival. It did. By reducing the lion population by 30 percent with an increased hunter harvest quota, FWP improved calf survival rates and helped the upper Bitterroot elk population rebound.

Marty Zaluski, Montana state veterinarian for the Department of Livestock, says FWP studies of elk movements have been essential for determining where livestock testing regulations are needed to protect the state's brucellosis-free status. "Identifying



CATCH AND RELEASE To learn where elk and other wildlife travel and the habitats they use, wildlife researchers fit them with GPS collars that record locations (right). That's easier said than done. Capturing big game animals requires aerial crews to shoot capture nets from helicopters (left). Animals are then bagged and transported (above) to where biologists can take blood samples and fit them with collars.

CLOCKWISE FROM TOP: TONY BYNUM; MONTANA FWP; SHAWN T. STEWART/FWP; SHAWN T. STEWART/FWP

cattle populations at risk of brucellosis from elk allows us to target regulations to make sure those cattle are tested before they enter interstate commerce," he says.

Another study's results showed that black bear hunting could reasonably continue in Montana. In the early 1990s, animal rights groups that had lobbied successfully to restrict bear harvest in Oregon and Colorado set their sights on Montana. They pointed out that FWP didn't know if hunters were killing more bears each year than the population could support. But after a nine-year study of black bear reproduction and mortality, FWP researchers found that only 3 percent of Montana's female black bears were being killed by hunters each year—well below the 10 to 15 percent maximum harvest rate that would threaten a sustainable population.

FWP scientists studying grizzly bears over the past two decades in the Northern Continental Divide Ecosystem, stretching from Glacier National Park south to the Blackfoot Valley, have documented that the population is healthy and growing. The evidence is Exhibit A as Montana petitions to remove grizzlies in that ecosystem from federal threatened species listing.

Searching for "shedders"

Historical context often helps wildlife scientists better understand their subjects. In the new bighorn study in the Pioneer and Highland mountains, evidence of ancient sheep-drive stations built by Indigenous people shows that these semi-arid, high-altitude ranges were a historical bighorn stronghold for hundreds or thousands of years. But unregulated hunting and new diseases from Europe wiped out the population by the early 1900s. After the Montana Fish and Game Department reintroduced wild sheep from the Rocky Mountain Front in the 1960s, the Highland population grew rapidly, to 300 to 400 bighorns by the early 1990s, many of them world-class rams. "It was one of the state's best sheep hunting and viewing areas," Boccadori says.

Then an outbreak of pneumonia in 1994-95 killed 80 to 90 percent of the herd. FWP has tried transplanting new bighorns from other parts of western Montana, but the population continues to falter. "I've watched this herd since 2005, and I've been seeing far too many lambs dying in their first year," Boccadori says.

But why? That's where Proffitt comes in. "We're trying to understand what's limiting population growth," the research scientist says. "It's possible these lambs are dying of pneumonia, but we need to learn if there are other causes of mortality."

In the winter of 2020-21, Proffitt, her team, and Boccadori captured almost all the ewes in the five sub-herds (52 total), determined which were pregnant, then fitted them with GPS collars that record and transmit six locations per day.

As soon as each ewe gave birth, researchers scrambled up rocky slopes to locate the newborn lamb and quickly fit it with a tiny GPS collar the size of a watchband (which pops off if the animal grows). Now Proffitt and Boccadori can see where the lambs go and, if they die, why. Proffitt says the young sheep may be mingling with "shedders," ewes in the herd that transmit pneumonia. "Or maybe they are being picked off by eagles or lions."

Boccadori hopes this research will provide FWP with new management options. "For instance, if we find out that pneumonia is the big issue, that tells us removing some shedders, if we can identify them, or even removing a subherd might work without

EXHIBIT A FWP bear research scientist Cecily Costello with a grizzly that she captured, tranquilized, and fitted with a GPS collar. FWP studies help bolster the argument that grizzlies could be removed from federal protection in parts of the state.

> "We're trying to understand what's limiting population growth. It's possible these lambs are dying of pneumonia, but we need to learn if there are other causes of mortality."

TOUGH CHOICE After shooting a Rock Creek bighorn sheep ewe that appeared sick with pneumonia, an FWP research crew takes blood and saliva samples. Killing infected sheep is sometimes necessary to prevent them from spreading disease to others in the herd.

FROM TOP: MONTANA FWP; PAUL N. QUENEAU

PARTNERS IN THE FIELD Above: Butte-area wildlife biologist Vanna Boccadori (left) works with research scientists to take blood samples and other measurements from bighorn sheep. Right: An FWP wildlife biologist and a research scientist team up to ear tag an elk as part of a study into why upper Bitterroot herds were declining.

having to take out the entire herd and start over with a blank slate," she says. "But if we learn that it's, say, predators, then removal wouldn't do any good and we'd have to figure something else out."

Data gets used

Other studies have other uses. For instance, a current study is helping researchers and biologists better understand the size and population trend of Montana's moose herds. "If a local population is trending down but we don't know it, we risk issuing too many hunting licenses and setting moose recovery back for years," says Ryan Rauscher, an FWP biologist responsible for managing moose along the Rocky Mountain Front.

According to Brett Dorak, FWP regional wildlife manager in Miles City, a current statewide pronghorn study is revealing where fences and other barriers block historical migration routes. "We're taking those maps to landowners and working with them to modify fences to allow for those seasonal movements," he says.

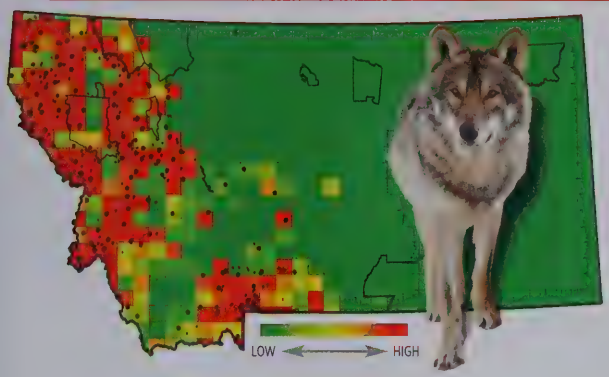
FWP isn't the only one putting its wildlife research information to work. The Montana Legislature and the Fish and Wildlife Commission regularly use the data for making laws and setting seasons. At their meeting this past August, commissioners frequently referenced the department's innovative wolf monitoring method developed over the past decade as they decided on appropriate statewide and regional harvest quotas. Gallatin County commissioners employ GPS maps of FWP elk movement to figure out how to manage mountain biking and other recreation in ways that don't harm wildlife. FWP bear management specialists use GPS locations to alert ranchers and homeowners of possible grizzly and black bear activity, locate areas where people may be attracting bears with unsecured food or garbage, or find bears that have been poached.

As of this fall, FWP has roughly 40 different studies under way, many in cooperation with the University of Montana and Montana State University. "We partner with professors, who have skills and expertise FWP might not have, and with their students, who are eager to do the work," Gude says. "It's a good deal for everyone." For instance, an MSU graduate student is looking at which trees in northeastern Montana are used by northern long-eared bats, a federally protected species in danger of extinc-

FROM TOP: ERIK PETERSEN; MONTANA FWP

IN GOOD HANDS Above left: Current studies on what causes moose to die and which habitats they use will help FWP conserve the widely beloved species. Above: Research on harlequin ducks is helping nongame wildlife managers learn why populations may be declining.

Hunters and others who value Montana's wildlife have long benefited from this information gathering and practical application.



BIG BUY-IN FWP's innovative "patch" modeling approach to estimating wolf populations has been endorsed by department wildlife managers and the Fish and Wildlife Commission.

tion. Federal agencies like the Bureau of Land Management (BLM) may use the survey information to identify which trees to leave standing in timber-thinning projects.

Gude says the lion's share of wildlife research funding comes from hunters and other gun owners via the federal Pittman-Robertson excise tax on firearms and ammunition, which is reimbursed to each state. Funds for nongame wildlife research come from the federally funded State Wildlife Grant program. Universities, nonprofits like the Rocky Mountain Elk Foundation and the wild sheep organizations working with Boccadori, and federal agencies such as the BLM and U.S. Fish & Wildlife Service also chip in with funding, labor, or both. In many cases private landowners provide FWP with permission to capture and follow wildlife on their properties.

Building confidence

Scientific knowledge is the foundation of decisions all people make every day. When conducted by trained scientists, it builds confidence—that the commercial airliner you're flying in won't crash, the food you buy at the grocery store won't sicken your family, the heart medicine your doctor prescribes won't kill you, or the number of antlerless permits in a hunting district won't over- or underharvest the elk population.

"We have a responsibility to manage this state's wildlife as effectively as we possibly can," says Wakeling, the FWP Game Management Bureau chief. "That means using the best possible science. Without solid data, we might as well be throwing darts at a dartboard."

Back at the Big Hole River, Boccadori, Proffitt, and I continue watching for the fallen lamb. Proffitt tells me it might be dead; despite taking careful precautions, researchers know there's always a risk of causing stress or even death to a study animal. She looks up again through her binoculars and scans the bluff. After a few more minutes, she whispers, "Yes," and points to the group, where we can now see all six lambs with their mothers.

That little one survived. But if later this year it and other lambs in the Highland herd die, Proffitt aims to figure out whatdunit. Then, as with other research projects, she'll share the information with FWP biologists like Boccadori to help them more effectively manage bighorn sheep and other wildlife populations across the state.

RESULTS ON THE GROUND Because FWP research helps biologists manage wildlife more effectively, everyone who values elk and other big game animals gains from study findings.

CLOCKWISE FROM TOP LEFT: FWP; DONALD M. JONES; BRANDON KIESLING

GRISLY BUSINESS A Montana Department of Transportation crew based in Wolf Point picks up a dead deer along Montana Highway 24 about 15 miles north of Glasgow.

PHOTO BY SEAN R. HEAVEY

The Carrion Crews

Thousands of deer and other wildlife are killed on Montana highways each year. Who picks up those carcasses, and what's being done to reduce the dangers to animals and drivers?

By Andrew McKean

KILLER CROSSINGS Above: Mule deer and white-tailed deer bucks are especially vulnerable to vehicle collisions during the November rut, when hormones cause erratic behavior. Below: Grizzlies and black bears regularly cross highways to reach seasonal habitat during spring and fall.

Nick Schriver has become a master of reading roadside deer, thanks to a long career with the Montana Department of Transportation (MDT) driving rural highways in all seasons, weather conditions, and times of day.

"If they have their head down feeding and their butts to the highway, you're probably good," says Schriver, a maintenance supervisor based in Wolf Point. "But if they're facing the road throwing their heads around, you'd better be slowing down."

Deer behaving erratically—twitchy and unsure which way to run, especially at dusk, dawn, or in the middle of the night—are often the ones drivers see later as roadkill. The dead animals are victims of collisions that routinely cause injury or even death to motorists, and usually outright kill or mortally wound the animal.

Deer aren't the only wildlife to suffer. Across Montana every year, MDT maintenance crews collect and record 6,000 to 7,000 wild animal carcasses. The state has the second-highest incidence of wildlife-vehicle collisions per capita in the nation due to our abundant wildlife and rural roads that run right through their habitat. Besides Fords, Toyotas, and Subarus, the casualties include elk, bears, pronghorn, moose, bighorn sheep, mountain lions, and smaller mammals, though the vast majority (90-plus percent) are white-tailed and mule deer.

The number of wildlife collisions in Montana is increasing, says Tom Martin, chief of MDT's Environmental Services Bureau, as the state's population increases and more visitors drive the state's scenic rural byways.

Wildlife are perishing in growing numbers on roadways in all other states, too. Across the nation, State Farm Insurance estimates that U.S. drivers hit an estimated 2.1 million animals between July 2020 and June 2021, a 7 percent jump over the previous year. The State Farm report detailed what it called "a veritable Noah's Ark of animals" that are killed on America's roadways. Deer kills are by far the most widely reported, with 1.4 million collisions, followed by 190,000 "unidentified animals," 111,000 rodents, 93,000 dogs, and 58,000 raccoons. Each year those collisions kill an average of 200 motorists, injure another 26,000, and cause an estimated $8 billion in property damage and other costs, according to the Pew Charitable Trust.

> Those crashes kill an average of 200 motorists a year, injure another 26,000, and cause an estimated $8 billion annually in property damage and other costs

And that's only the reported accidents. Safety officials estimate that each year hundreds of thousands of wildlife collisions go untallied.

The problem is so universal and costly that Congress dedicated $350 million of 2021's federal infrastructure funding to study effective wildlife crossings. The Bozeman-based Center for Large Landscape Conservation is working with partners to design projects that identify particularly problematic stretches of highway and find ways of reducing wildlife collisions.

BREATH MINTS COME IN HANDY

Schriver's job with MDT is to count the number of deer, pronghorn, elk—even pheasants and porcupines—hit by motorists in one of the most game-rich parts of Montana: the remote northeastern corner. On his thousand-mile routes, he also keeps an eye out for road stretches that need special signage and notes damage to bridges and asphalt, plugged culverts, accumulating ice, disabled vehicles, and even blown tires and other debris.

But roadkill is the constant though unsavory work that he, his team, and the dozen or so other road maintenance crews do across Montana. "It's probably the worst most important job in state government, removing roadkill and keeping our roadways safe for the

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Andrew McKean, hunting editor of Outdoor Life, *lives on a ranch with his family near Glasgow.*

FROM TOP: PAUL N. QUENEAU; DAWN WILSON. OPPOSITE PAGE: SEAN R. HEAVEY

traveling public," Schriver says.

Schriver's crew removes the carcasses from the roadways of northeastern Montana at least twice each week. When they can, they deliver remains to municipal landfills, but more frequently they drag shattered ribcages and punctured paunches off the right-of-way, to prevent scavengers like golden and bald eagles from becoming roadkill themselves. MDT also maintains a few composting facilities where carcasses break down into compost, reducing the need to visit landfills. The threat of carcasses containing chronic wasting disease prions prevents the compost from being used for highway revegetation.

It's no pleasant task, collecting these broken remains. Many carcasses have been disfigured beyond recognition by the impact with vehicles, and most are in various states of decomposition or scavenging. Schriver goes through several pairs of durable rubber gloves in the course of a carrion-collecting season. Breath mints and gum can help mask the smell of particularly putrid carcasses.

The maintenance supervisor says his crews are most active in the spring, as snow melts and greening grass along highway shoulders attracts deer, and in the fall, when both hunting season and the rut cause herds to break up and bucks and bulls to act erratically. Roads, and the vehicles that travel them, also cross the migration routes of mule deer and pronghorn moving sometimes hundreds of miles across landscapes. Schriver says he dreads winter storms, not only for the deteriorating road conditions, but because they often trigger migra-

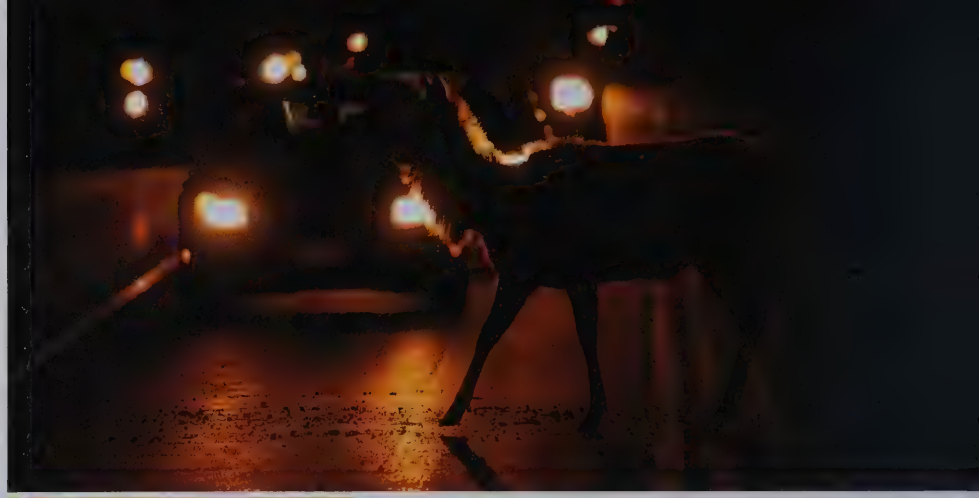
THIS WORK STINKS Above: Zac Beil (left) and Ryan Feezell load a roadkill deer into an MDT truck. Right: Feezell gasps for air.

> "It's probably the worst most important job in state government."

HOW TO DRIVE SAFELY IN WILDLIFE COUNTRY

You could argue that every mile of Montana highway has the potential for wildlife collisions. But some areas require special vigilance. Here are several tips for safe driving, provided by Montana Department of Transportation sources:

- **Slow down:** In areas with limited visibility—vegetation grows right up to the shoulder or terrain rises or drops abruptly—slow down so you can react in time to an animal that darts into your lane.
- **Keep your eyes moving:** Scan the roadway and shoulder, paying special attention to unexpected movement like animals crossing far ahead. Others are likely following.
- **Learn trouble spots, times, and seasons:** Most animals move at dawn and dusk. The elk rut in late September and deer rut in early November cause bulls and bucks to move erratically. Bears move around more in October as they frantically feed to bulk up for winter hibernation. Deer frequent roadsides in the early spring to feed on emerging vegetation.
- **Don't overrun your headlights:** That means driving slow enough at night to be able to stop before hitting something your lights illuminate.
- **Honk:** Honking can be an effective way to move animals away from roads, but don't do it casually. Lay on the horn for a long, continuous blast rather than short, staccato bursts.
- **Don't swerve:** Defensive drivers usually spot hazards in time to avoid them, but sometimes a crash is unavoidable. In those instances, brake as vigorously as you can without going into a slide, but do not swerve. Swerving can take your car into oncoming traffic or cause it to leave the road. In these cases, you're better off just hitting the animal straight on, despite the damage to your vehicle and the animal.
- **Note wildlife crossing signs:** These yellow signs are installed where people regularly run into deer, pronghorn, or elk. In these stretches, slow down, keep your head on a swivel, and avoid becoming—or creating—another wildlife-collision statistic. ■



FROM CRITTERS TO COMPOST Top: A cow elk holds up traffic in western Montana. Right: A sign at an MDT composting facility indicates where people should bring dead big game animals. The carcasses eventually break down into organic matter. Though originally intended as compost for highway revegetation projects, concerns about spreading chronic wasting disease prions forced MDT to scrap the plan.

tions, pushing entire herds of animals across highways. Those are busy times not only for MDT's snowplow drivers, but also for the department's "carrion crews."

TROUBLE SPOTS

The Wolf Point team, along with dozens of other MDT crews performing similar jobs around the state, don't just remove roadkill. They also document their work: when and where they collect carcasses along with details on each animal's species and condition.

That data pours in weekly to Doug McBroom's computer in Helena. McBroom, operations manager for MDT's Maintenance Division, curates perhaps the most grisly database in Montana.

If roadkill has an afterlife, it's in this information used in Tom Martin's Environmental Services Bureau to determine locations for wildlife-friendly bridges, culverts on a new highway project, 8-foot-high woven-wire fencing that keeps animals off roadways, and deer crossing signs on lonely Montana two-lanes.

Montana has been compiling this information digitally since 2017—McBroom's database has about 30,000 individual data points that represent wildlife collisions—but people who regularly drive those roads are already aware of the most dangerous stretches.

"The locals know where and when to go slow," McBroom says. "They're places where the highway runs right through a combination of cover, water, and food," and where the terrain funnels animals into drivers' blindspots for a mad dash across the asphalt. Many don't make it.

Schriver takes me to one of these sites, on the east side of the tiny town of Nashua, on U.S. Highway 2 between Glasgow and Wolf Point. A grove of scraggly ash trees shades Porcupine Creek on the north side of the road, while a field of spring wheat extends to the south. A few dozen yards off either side of the highway are the bleached bones and leathered hides of deer—both whitetails and mule deer—that died too far from the road to concern MDT's carrion crew.

> "They're places where the highway runs right through a combination of cover, water, and food."

"I don't know how many dozens of deer we've picked up here over the years, but it's a lot," Schriver says. "The only thing that prevents more deer from getting hit right here is that the speed limit coming out of Nashua is still 55 miles per hour."

Schriver's description of these "trouble spots" is usually confirmed by McBroom's map. Montana has hundreds of such places, where data clusters identify multiple collisions. One notorious stretch of Interstate 90 southeast of Missoula sees a dozen or more black bear deaths each year. U.S. Highway 93 south of Flathead Lake became so dangerous for drivers, deer, and bears that the Confederated Salish and Kootenai Tribes installed a multimillion-dollar wildlife overpass, the only one in the state. Montana's worst spots may also have small white crosses on the highway shoulders, each signifying a collision that was also fatal to the driver, passenger, or both.

ASKING DRIVERS TO HELP

McBroom's digital map isn't the only registry of wildlife collisions in the state. The Montana Highway Patrol records collisions, and several wildlife groups and agencies have developed their own databases using driver-reported observations. One mobile app called WildlifeXing, maintained by a cross-border team of wildlife managers, asks travelers to record roadside pronghorn—alive and dead—spotted across southern Alberta, southern Saskatchewan, and northern Montana. Information from this and other citizen efforts is shared with MDT, along with wildlife-collision reports from the Montana Highway Patrol and migration data from Montana Fish, Wildlife & Parks and the U.S. Fish & Wildlife Service.

Much of the FWP information is from animals with GPS collars—ungulates like elk and pronghorn but also species such as grizzly bears. Signals from the collars tell biologists when, where, and how frequently animals cross highways. FWP also issues and records roadkill-salvage permits, enabling motorists to take home an accident-causing deer, elk, moose, or pronghorn and turn it into burgers and roasts to feed their family.

However, salvage-permit requests are a messy metric, says Lauri Hanauska-Brown, of FWP's Wildlife Division. "Just because we don't have any salvage-permit requests from a certain stretch of highway doesn't mean there aren't problems there," she says. "Fewer people living in certain parts of Montana results in fewer permit requests," even though the number of collisions may be just as high

FROM TOP: DAWN WILSON; NORA SAKS/MTPR

as areas where roadkill salvage is routine.

Hanauska-Brown says local knowledge of wildlife is critical. "MDT is replacing several bridges on a stretch of U.S. Highway 87 east of Lewistown, and they want to know where the major wildlife crossings are," she says. "It's a stretch of highway where we have very few radio-collared animals, but our area wildlife biologist knows where animals cross and when." She adds that MDT is using the information to determine the feasibility of modifying bridge designs or other ways to facilitate easier highway crossings for wildlife.

SALT LICK A sign with flashers indicates where bighorn sheep congregate, often to lick road salt off the highway in winter. Indicators and fencing help, but the best ways for motorists to avoid collisions with wildlife is to slow down and stay alert to animals on the road.

NEW MAPPING TOOL

Deer have been killed by motorists on Montana roads for as long as there have been highways and fast-driving vehicles. But Martin, the MDT Environmental Services Bureau chief, says the amount and type of knowledge available has steadily improved with evolutions in technology. A new web-based mapping tool is expected to launch this winter. Created in collaboration with FWP and the nonprofit Montanans for Safe Wildlife Passage, it will integrate several data streams, including carcass and collision reports as well as traffic, wildlife, and infrastructure data. The information will be used by agencies and local governments to plan what Martin calls "wildlife accommodation projects" on Montana highways.

Wildlife need the assistance. All species need to move seasonally or even more frequently from one type of habitat to another. Deer, for example, annually travel from winter thermal cover to spring fawning grounds.

Highways impede that vital movement. The roadblocks not only lead to costly and even deadly collisions, they disrupt historical wildlife movement patterns established over thousands of years.

FWP biologists have tracked wildlife movement and migration routes for decades. "We know of places where pronghorn or mule deer have been traveling for generations to reach more hospitable areas in winter or return to fawning grounds in spring," says Hanauska-Brown. "But now they have to run through a gauntlet of fences and highways to get from one place to another. Many don't make it, and some just stop trying."

That can lead to increased winter mortality and reduced fawn production.

Initially, the mapping tool will be used by agency and government civil engineers and planners. On U.S. Highway 2 near the Thompson Chain of Lakes, MDT is investigating the feasibility of installing a wildlife underpass culvert where FWP and MDT have documented regular deer, moose, grizzly bear, and other wildlife movement.

"We've had good success with undercrossings, which are very effective and far less expensive than the highly publicized overcrossings," says Martin.

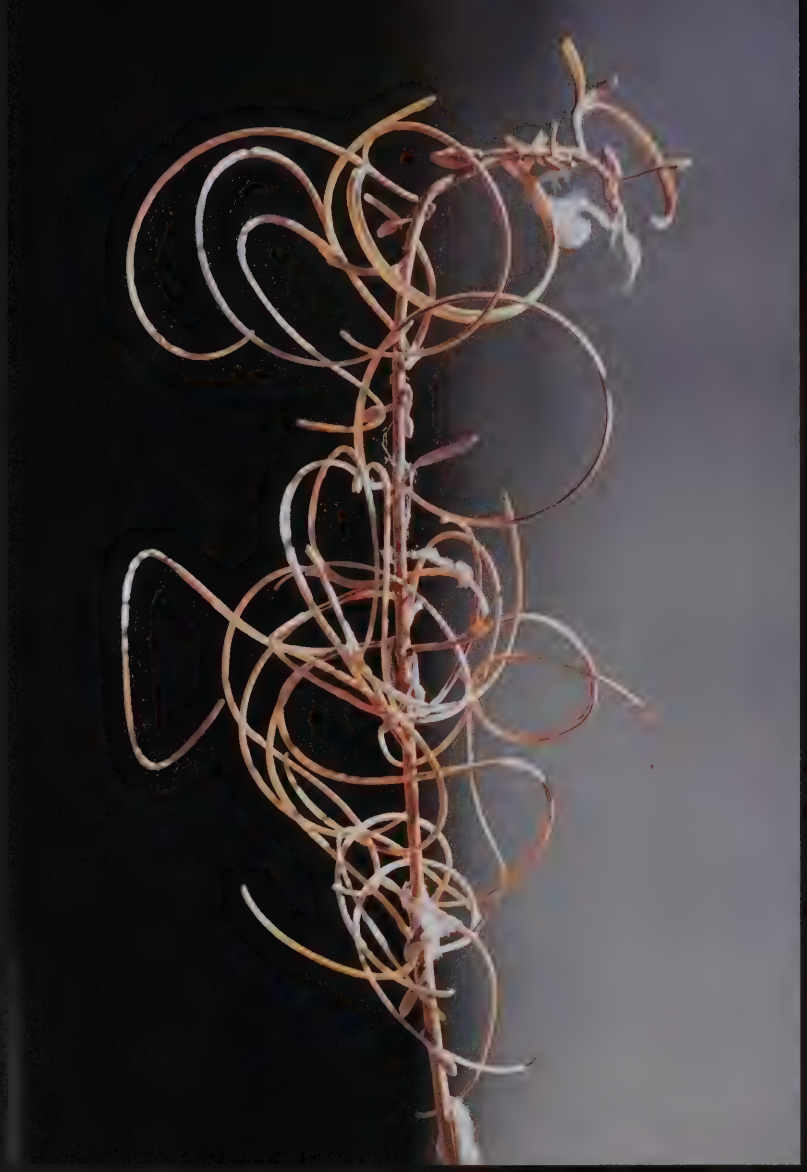
In time, the mapping tool will lead to a public version, similar to MDT's popular 511 mobile app that alerts motorists to hazardous road conditions, construction zones, and traffic incidents.

Though the new technology can make highways safer and reduce Montana's roadkill tally, Schriver says it's ultimately up to drivers to pay attention and avoid collisions. That starts with "reading" deer behavior and paying attention to those yellow diamond-shaped signs showing a deer, bighorn sheep, or moose that cause any prudent driver to ease up on the gas.

"They're there for a reason," Schriver says. "Locals tend to just ignore them after a while, but hopefully they get the attention of a driver from somewhere else traveling across Highway 2. If they see a sign, or the new 'Antelope Crossing' flashers that we put up in recent years, hopefully they'll slow down so their vehicle, the animal, and maybe even the driver's life will be spared."

SAFE PASSAGE MDT has installed dozens of undercrossing culverts beneath highway trouble spots across Montana. This doe and her fawns are moving beneath Montana Highway 200 east of Lincoln.

FROM TOP: PHIL FARNES: CSKT/MDT/MSU



THOSE OTHER FALL COLORS

Fall in Montana is not fall in, say, Wisconsin or New England, where gaudy sugar maples and ancient oaks light up entire counties in brilliant reds, oranges, and yellows. Yet this is without question the Treasure State's prettiest season. And not just from quaking aspen stands shouting yellow from forest ravines, golden tamaracks transforming mountainsides, or cottonwoods glowing along the upper Yellowstone River. Those gift shop calendar images are certainly lovely, but Montana's autumn is also awash in quieter, subtle colors.

Lichens, for instance. These mysterious fungus-algae combos come in pigmentations—grays, yellows, oranges, and even fluorescent greens—that become more intense in the wet, cool conditions of fall. Lichen pigmentation is a by-product of complex tissue chemistry that blocks harmful ultraviolet rays, allows the organisms to absorb light and heat, and protects them from being eaten.

But enough of the science. Across Montana, lichens are painting prairies and forests with their quiet hues, as are shrubs, grasses, forbs, algaes, mosses, and ferns. Next time you're outdoors, try to look past the gaudy aspens and larches to find these other fall colors. They may not grace a calendar cover, but they still add vivid accents that illuminate this wonderful time of year. —*Editor*

Above: Fireweed in late fall
RICK CLARK

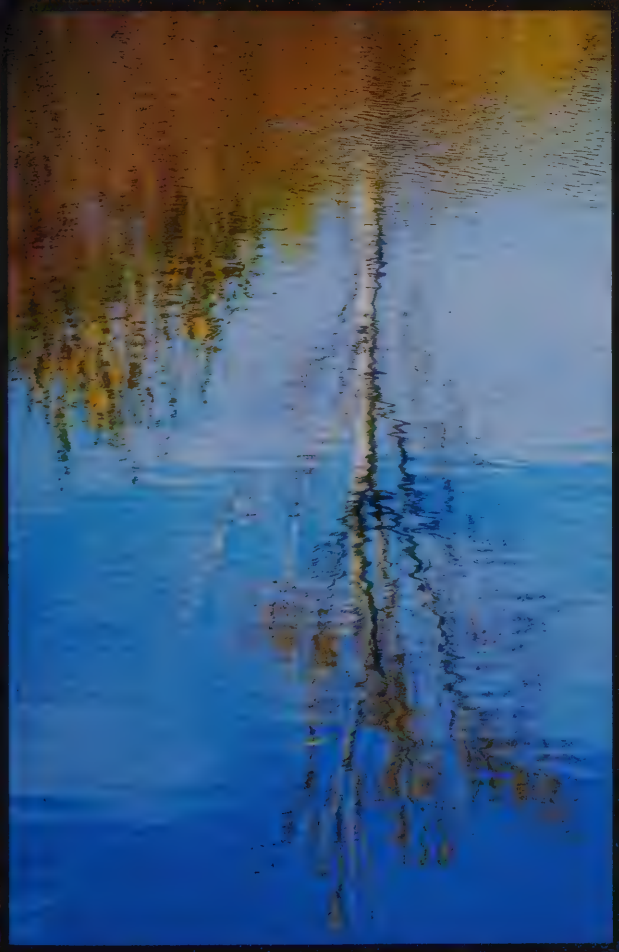
Opposite page: Red osier dogwood against Cataract Falls near Augusta
KEVIN LEAGUE

Above: Illuminated slopes below the snowcapped Garden Wall, Glacier National Park
JOHN LAMBING

Right: Decaying leaves near Missoula
PAUL QUENEAU

Above: Autumn willows along Prickly Pear Creek near Helena
STEVE McMORRAN

Left: Black-capped chickadee on fallen maple leaves and moss
DONALD M. JONES

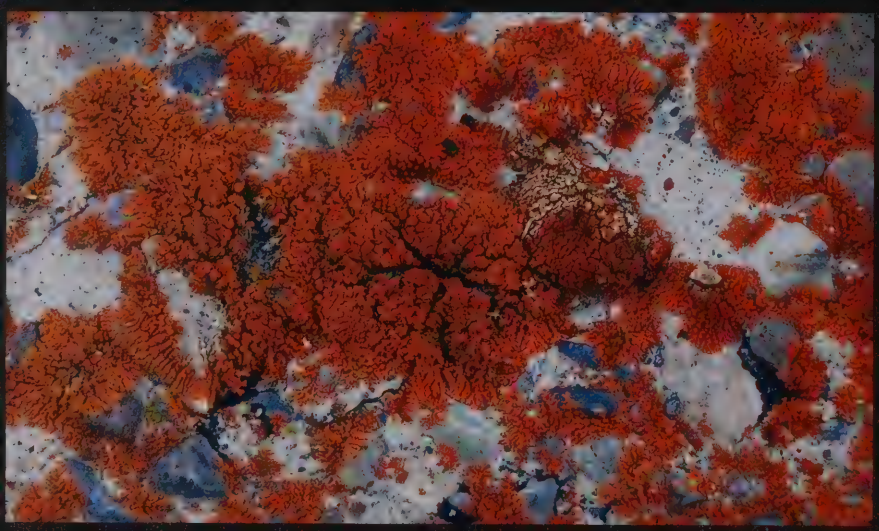


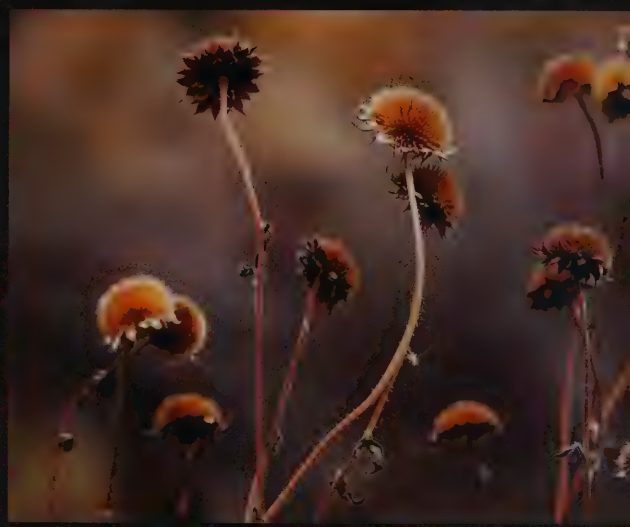
Opposite page: A dog runs along the banks of Fleshman Creek near Livingston
ALLEN RUSSELL

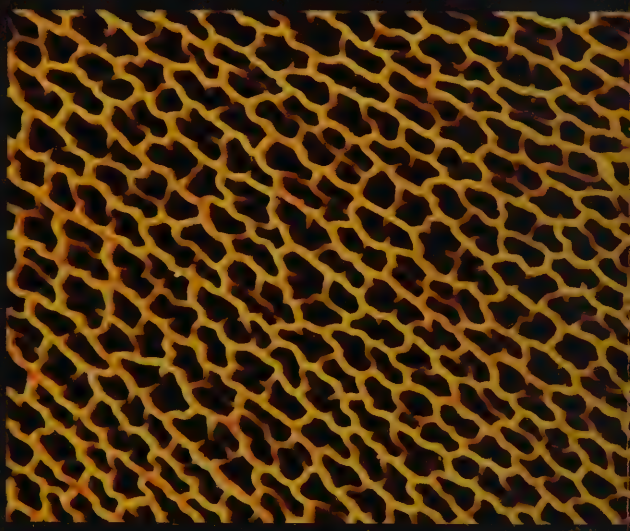
Left: Fall foliage reflection
ROSS PETER NELSON

Top: A mallard drake takes flight at Red Rock Lakes National Wildlife Refuge
KEN ARCHER

Above: Bull elk in shadow behind illuminated grasses
JOEL MAES







Top left: Seedling emerging from a crack in a fallen tree along the Clark Fork River
TOM PATRICK

Top right: Jelly fungus on a spruce log, Flathead Valley
DEE LINNELL BLANK

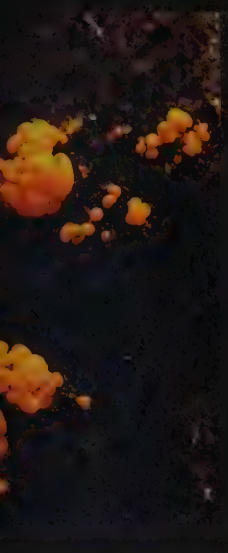
Middle left: Lichen layers on a boulder
STEVE LUFT

Middle right: Dried coneflower heads
JULIE BETTS

Bottom left: Frosty leaves in the Flathead National Forest
LAURA VERHAEGHE

Bottom right: Underside of a rosy larch bolete mushroom, near Victor
STEVEN AKRE

Opposite page: Old-growth forest floor along Pete Creek in the Purcell Mountains
RANDY BEACHAM



Above: Autumn light over Skalkaho Creek, Bitterroot Valley
ESTELLE SHUTTLEWORTH

Right: Pronghorn buck in prairie foliage during the rut
LON LAUBER

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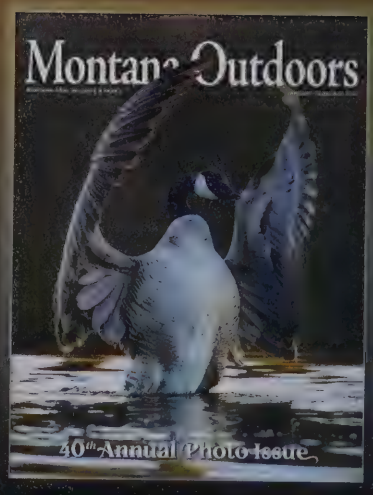

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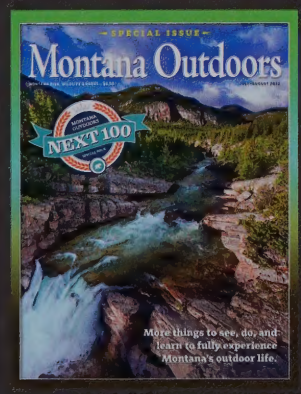

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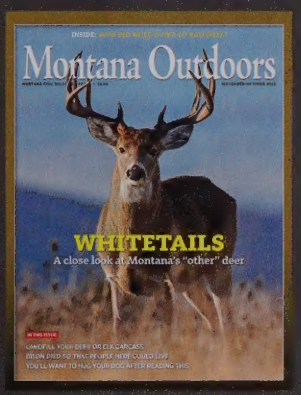

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Death by Feeding The unintended—and sometimes fatal—consequences of providing food to deer, moose, elk, and other wildlife in winter. By Julie Lue

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Whatdunit? Research scientists conduct studies to gather information biologists need to better manage Montana's wildlife. By Tom Dickson

The Carrion Crews Thousands of deer and other wildlife are killed on Montana highways each year. Who picks up those carcasses, and what's being done to reduce the dangers to animals and drivers? By Andrew McKean.

Those Other Fall Colors Photo essay

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The dog days of autumn

By Tom Dickson

Is it just my imagination, or are there more hunting dogs in Montana these days? Just last week I saw a springer, a Brittany, two Labs, a pudelpointer, a small Munsterlander, and about a half-dozen wire-haired pointing griffons, which seem to be the breed of choice in Helena these days.

It makes sense. Bird dogs enhance waterfowl and upland bird hunting enjoyment and success, and they (usually) make great pets. Good with kids. Trainable. Loyal.

Hunting dogs weren't nearly so popular here a half-century ago. When my friend and previous *Montana Outdoors* editor Dave Books moved to Montana in the early 1970s, relatively few duck hunters owned trained retrievers, and getting a pointing dog for sharptails, gray (Hungarian) partridge, and pheasants was practically unheard of.

The exceptions, according to Dave, were duck dogs belonging to a group of retriever advocates who lived in and around Missoula. These hunters and field trialers were inspired by Billy Wunderlich, a Minnesotan whose retrievers had won several national championships in the 1950s and who eventually moved to St. Ignatius.

Hunting dogs, also known as "sporting breeds," fall into two main categories. "Retrievers" tend to be large, with thick, oily coats that withstand cold water. They are bred and trained to bring back shot ducks, geese, and upland birds. The most popular are Labrador (Labs), golden, and Chesapeake Bay retrievers.

"Pointers" are faster, slimmer dogs with lighter coats. They range out a quarter-mile or more in search of scent then stop dead still and aim their muzzle at the hidden prey. Pointers are taught not to move until the hunter walks up and flushes the bird for a shot. The most common purely pointing breeds are English setters, Brittanies, and English pointers.

The fellow who brought pointers to prominence in Montana was Ben Williams, who lives outside of Livingston. Williams raised Brittanies and focused on hunting gray partridge, a tight-holding import from Europe. "Ben, who moved to Montana from Washington state in 1963, believes he was among the first to run Brittany spaniels here," Dave wrote in a 1988 *Montana Outdoors* article.

If I'm any indication, the desire for a pointing dog often comes from growing too old to chase after a retriever that's busting birds out 100 yards away. Hunting over a pointer is a leisurely affair. You stroll more and stumble less.

Other popular pointers—German wirehairs and German shorthairs—fall into the "versatile hunting breeds" category of dogs bred to point *and* retrieve with equal relish. These increasingly popular dogs also include Gordon and Irish setters, Vizslas, Weimaraners, and the aforementioned pudelpointers, small and large Munsterlanders, and wire-haired pointing griffons (which is what my nine-year-old Mesa is).

The great appeal of upland dogs is that they find birds. That's increasingly important these days, as pheasant, gray partridge, and sharp-tailed grouse numbers continue to decline. Blame that on the loss of more than 2 million acres of CRP (Conservation Reserve Program) grasslands over the past decade and the seemingly endless drought that has reduced so much upland bird cover to a dusty moonscape.

The rooster harvest graph on page 20 of this issue shows that pheasant numbers rose in the 1960s during the Soil Bank era, declined when that federal farm program ended, then climbed again with the advent of the federal Conservation Reserve Program. But as CRP grasslands were converted back to crops over the past decade due to rising commodity prices, pheasant numbers have plummeted.

FWP is doing all it can to compensate with upland bird habitat leasing and conservation easement contracts. But making up for all those lost acres is hard when weather and a multibillion-dollar federal farm program conspire against you.

So we upland hunters do everything we can to find those few remaining birds—scout more, drive farther, hunt harder. And buy and train four-legged pheasant-finders.

I'm looking again at that 1953 rooster harvest. Wow: 390,000 birds, back when about half as many people lived in Montana as there are today. Those really were the days. A hunter didn't even need a dog; you just walked around in tall weeds and had your limit by noon.

Then again, maybe that wasn't so great. I'd much prefer even a birdless day of hunting with a dog to a limit of roosters without one. Mesa and I sometimes walk for hours and don't see a single rooster, sharptail, or partridge. We still have a wonderful time. A full game bag is always satisfying, but even when bird numbers are low, nothing beats a day roaming the prairie with an eager dog out ahead, the two of you searching together for whatever there is to find.

Tom Dickson is the Montana Outdoors *editor.*

GERMAN WIREHAIRED POINTER ILLUSTRATION BY STAN FELLOWS

DOUG MCSPADDEN

Dark-eyed junco

Junco hyemalis By Sneed B. Collard III

SCIENTIFIC NAME *Junco* is the Latin word for reed bunting, a dark-headed Old World songbird that superficially resembles the dark-eyed junco. *Hyemalis* is Latin for "of winter."

They show up under our bird feeder the first or second week of October: handsome little birds with rufous backs, pink bills, and solid black or gray heads. Unlike the chickadees and nuthatches that pluck seeds directly from the feeder, these new arrivals stake out the ground, sorting through the spillage while marking the inexorable change of seasons. In doing so, they radiate a sense of well-being, a message that all is well with the natural world even as winter approaches. Fittingly, John J. Audubon joined previous generations of naturalists in calling this sparrow the snowbird. Today we know it as the dark-eyed junco.

APPEARANCE

Larger than many other sparrows, the dark-eyed junco offers a welcome relief from the usual streaky brown sparrow color scheme of winter birds. Juncos sport attractive, relatively solid shades of brown, rust, black, and gray that contrast with a clean white belly. In most varieties, the head is a uniform gray or black that stands out from the rest of the body, though this can be subtle in slate-colored birds. Juncos are most easily identified in the field by the flash of their white outer tail feathers as they take flight.

Sneed B. Collard III is a writer in Missoula.

CLASSIFICATION

In part because different groups of juncos have markedly different color palettes, this species has been caught in a scientific nomenclature tug of war. Until the 1970s, the dark-eyed junco was split into five distinct species, and some ornithologists still adhere to this scheme. According to Cornell Lab of Ornithology's Birds of the World, however, scientists currently recognize five "groups" of dark-eyed juncos, each containing between one and eight subspecies. In western Montana, the Oregon group, with rufous backs and dark heads, predominates. In central Montana, you're more likely to see the pink-sided group, with pinkish flanks and light gray heads. As you move east, you enter the territory of the especially beautiful slate-colored group. But be warned: It's common to see members of different groups cavorting together!

SOUND

Dark-eyed juncos produce a medium- to fast-paced trill often confused with that of chipping sparrows, but it's a sweeter, more musical sound. While juncos begin singing by mid-March, chipping sparrows do not generally return to Montana until late April—a useful clue when trying to identify a spring chorus.

DISTRIBUTION AND HABITAT

The dark-eyed junco can be found year-round in much of the West, upper Midwest, and Northeast. In winter, it ranges throughout the Lower 48 except for certain parts of Florida and other Gulf Coast states. This species occupies a wide variety of forest habitats including burned forest. A mix of open ground and tree cover seems to be ideal. While the birds generally breed in natural forests, flocks often move into suburban and urban settings each fall and winter.

FEEDING AND BREEDING

Like other sparrows, the dark-eyed junco depends mostly on seeds, but will eat insects, spiders, and other invertebrates, especially during breeding season. Females build cup nests in small cavities, sloping banks, root balls of fallen trees, tree branches, bases of trees and bushes, and even barns and other structures. Most commonly, the female lays three to five pale, elliptical eggs and performs all incubation duties. Both parents defend the nest and feed the young.

CONSERVATION

The nation's second-most abundant songbirds behind American robins, dark-eyed juncos number in the hundreds of millions. As with many other songbirds, however, populations have decreased in recent decades. In Montana, surveys indicate that dark-eyed junco numbers declined 2.6 percent per year between 1966 and 2010. Major culprits include habitat loss, collisions with buildings and other structures, and predation by outdoor cats.

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